THE IRON AGE

New York, March 24, 1927

ESTABLISHED 1855

VOL. 119, No. 12

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Is the Tinless Can a Possibility?

Lacquered or Enameled Sheet Metal Containers Advocated as an Answer to Problems Encountered Today Solution Based on an Extended Research

BY C. L. MANTELL

P OR some time, due partly to the advancing prices of tin, which have reached the highest level since the war, and partly to other conditions, the research committee of the National Canners Association has been conducting an extensive investigation into the question as to whether a substitute is possible for the present tinned can for food preservation. The author of this article, together with E. S. Lincoln, consulting engineer, New York, has been closely associated with the details of this research. The article, which may seem to stress the case against the tinned can unduly, gives briefly the results of some of the work.

HE tin can leaves much to be desired as a perfect container. Until the development of the "tinless can," there was not available a substitute which had all the commercial features of the tin can. Glass would eliminate corrosion, but it is not suitable nor adaptable for cheap transportation. Paper containers will not stand food processing or mechanical sealing. Non-ferrous metal containers are more costly than tin plate and bring along their own corrosion problems. Even with its defects, the tin can is more or less adapted to a great variety of different food products. Canned food losses due to can failures bulk very large in actual money, although the percentage of can failures is very small. An estimate of the size of the can industry may be gained from the statement that each one of us is responsible, directly or indirectly, for the destruction of a can per day for every day in the year, as the result of our consumption of canned food prod-

Effects of Tin Plate Corrosion

In their extended study of the corrosion of tin plate in the shape of tin cans used for food products, Mantell and Lincoln observed three different types of effects:

Discoloration, which results in tarnishing, darkening or

kening the inside of the container.

Perforation, which causes the formation of holes in the Perforation. to the detriment and spoilage of the enclosed food

Solution or etching, which is the result of chemical action the food product on the metal of the container.

Discoloration is caused by sulpho-compounds in the food. The sulphides of iron and tin (stannous) are both black. Can black is easily observed in its formation. Perforation is the result of electrolytic action in the cans as the result of two dissimilar metals in contact with the solutions in the cans. It is a difficult matter to form a perfectly continuous tin coating over the iron base metal of tin plate. Commercial manufacture of tin plate free from pin holes is practically impossible. In order to avoid electrolytic action and perforation it would be necessary to have only one metal exposed to the action of the contents of the can. We can have only one metal exposed if we either completely cover the iron with tin, or else eliminate one metal, preferably the high-priced tin.

Millivoltages measured between iron and tin electrodes in cans of food products preserved in salt solutions rise to a peak value, fade off to zero, and then build up to a peak value in the reverse direction. The iron of the tin plate, previously anodic, is changed to cathode in the electrolytic cell. The iron base metal undergoes passivation as the result of the formation of a gaseous film, or an oxide coating, or the result of chemical action. Those food products which cause electromotive force reversal do not cause perforation troubles in cans.

Fruits and berries, put up in sugar solutions, do not show potential reversals. They bring perforation troubles. The addition of a strong electrolyte, such as sodium chloride or sodium sulphate, causes potential reversal and presumably elimination of perforation difficulties.

It is not the usual condition that there is no chemical action on the tin of the tin plate by the contents of the can. It is quite usual to have chemical action on the tin by organic acids, along with or pre-

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ceeding electrolytic action. The common fruit acids, citric, malic, acetic, tartaric and lactic, all attack tin. With the exception of canned clams, practically all canned foods are acid in reaction. The detinning action of spinach, pumpkin, squash, rhubarb, grapefruit and apples is quite severe.

If we were to have a completely tinned sheet, free from pin holes, in contact with these foods, we would first expect chemical attack on the tin. If the action were continued long enough, sufficient tin would be dissolved to expose the iron of the base metal. Electrolytic action would then set in. If there were no neutralizing factors, that is, if the attacking constituent were neither consumed nor brought to equilibrium, no matter how heavy a coating of tin was put on tin cans perforation would eventually occur.

Lacquered or Enameled Cans in Use

Enameled or lacquered cans have been used here and abroad, the additional coating being made on tin plate. Tin bleaches the color of some fruits, as strawberries for example. It is no less difficult to make a perfectly continuous coating of an enamel or lacquer on a commercial scale on tin plate, than it is to make a continuous coating of tin on a steel plate. If the enamel or lacquer coating be not continuous, chemical and electrolytic action of the constituents of the food products, instead of being spread over the whole area of the can, will be localized at those points where the coating is not continuous. Perforation is accelerated in enameled or lacquered cans made of tin plate.

If one of the two metals of tin plate were eliminated, practically all the electrolytic action would vanish. There is a definite field for containers in which tin is absent, that is, a container made of sheet steel with an enameled or lacquered surface. If the coating were not continuous, the steel might be rusted at the exposed spots. Commercial experiments on tinless

enameled or lacquered cans have been highly successful in the case of a number of food products, particularly those of marine origin.

Decorative Appeal of Tin

A factor to be considered in the use of tin cans is the thought that in many cases the use of tin is decorative. The attractiveness of the bright white metal is an important reason for the popularity of the tin can in the eyes of the housewife. The tin can is a "good package."

Tinless cans made of black plate, welded together, lacquered or enameled, are the solution of many of the corrosion difficulties encountered with present day tin cans. Discoloration, objectionable from the aesthetic viewpoint, would be largely eliminated. Perforation difficulties vanish almost entirely. Etching, the result of chemical solution of the tin of the tin plate, resulting in increased tin content of the food, passes out of consideration in the case of the tinless can.

Tinless Cans and the Tin Plate Industry

The effect of the advent of the tinless can on the tin plate industry will be negligible for several years. About 37.5 per cent of our annual tin consumption goes into tin plate. About 70 per cent of all the tin plate manufactured goes into canners' cans. Approximately 28,000 tons of tin annually is consumed for the manufacture of approximately 1,550,000 tons of tin plate. The tin can is exceedingly well established in the mind of the American public. The tinless can has been shown to be a more satisfactory container from the corrosion viewpoint. It will have to meet trade prejudices, established customs, and fixed ideas not easily changed. It is very likely that its commercial progress, despite the merits of the article, will be regretfully slow.

Leading Steel Makers Earn 7.37 Per Cent on Investment

Companies Producing 75 Per Cent of Rolled and Finished Steel in 1926 Had Earned Only 5.93 Per Cent on Stockholders' In-

vestment in the Previous Year

ANALYSIS of the 1926 earnings of the eight companies which produced approximately 74.85 per cent of the total rolled and finished steel shipments last year shows a much better return on the stockholders' investment than was the case in 1925. The stockholders' investment is considered as representing the sum of the common stock, the preferred stock and surplus, and the earnings are net after providing for depreciation, depletion and bond interest, the latter being in essence a payment of interest on borrowed money. The total net earnings of these companies in 1926 amounted to \$187,460,000 and in the previous year, to \$146,798,000. Last year they earned 7.37 per cent on this basis, as compared with 5.93 per cent in 1925.

As the attached table shows, there was a substantial gain reported by each company except one, the

exception being the Central Alloy Steel Corporation, Massillon, Ohio, which was formed by a merger during the year. At that time the amount of the common stock of the two merging companies was substantially increased, and the company is regarded as having made a favorable showing, considering the time naturally required to coordinate its component parts.

Two companies showed a stockholders' return of more than 10 per cent, and a third approached this figure closely, while last year the Youngstown Sheet & Tube Co. alone realized this high return. It is also interesting to note that the increase over 1925 on investment return as reported by the United States Steel Corporation approximates the average increase of the other companies. Details are shown in the following table:

ANALYSIS OF THE EARNINGS OF THE EIGHT LARGEST STEEL COMPANIES DURING 1926 WITH AMOUNTS SHOWN IN THOUSANDS OF DOLLARS

	As	of Dec. 31, 1	925	Total Stock-	Net Earn-	Per Cent Earnings on Stockholders	Net Earn-	on Stock- holders'
Name of Company United States Steel Corporation. Bethlehem Steel Corporation. Jones & Laughlin Steel Corporation Youngstown Sheet & Tube Co Inland Steel Co Wheeling Steel Corporation. *Central Alloy Steel Corporation. Republic Iron & Steel Co	180,152 57,332 75,000 35,000 39,470 6,603	Stock \$360,281 59,891 56,850 14,241 10,000 27,530 9,489	and the second	holders' Investment 3\$1,630,447 343,143 155,124 122,623 64,830 74,789 62,748	ings, 1926 \$116,366 20,246 15,149 7,148 5,006 3,331 5,065	Investment, 1926 7.1 5.9 9.7 12.4 11.2 6.7 5.3 5.7	1ngs, 1925 \$90,602 13,858 9,854 13,227 4,869 4,073 4,073 3,813	Investment, 1925 5.7 4.2 6.6 11.6 7.6 3.5 4.3
Total	. \$931,860			\$2,542,266	\$187,460	1.01	\$146,798	
*Figured on earnings of Centr	al Steel	Co. and U	nited Allo	y Steel Corp	oration wh	ich were mer	ged in Ju	ly, 1926.

Quenching Coke Through a Boiler

Incandescent Mass Passes Between Banks of Tubes -Its Heat Is Both Radiated and Carried by Convection to Evaporate Water

BY SIDNEY G. KOON

RY quenching of by-product coke, with resultant evaporation of water by liberated heat, has been adopted in two or more methods by different designers. In THE IRON AGE of Feb. 10 at page 439 is a description of the Swiss method in vogue at Rochester, N. Y. In this case the coke passes through a container and not directly through the boiler.

Quite different from the plant at Rochester is one which has been installed by the Syracuse (N. Y.) Lighting Co. This again, is experimental and is undergoing changes, particularly in the method of getting the quenched coke away from the quencher. It is a design of Hawley Taussig, engineer of the U. G. I. Contracting Co., Philadelphia, who did not live to see it in operation. The plant is under the supervision of Harold K. Seeley, superintendent of gas production of the Syracuse Lighting Co.

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Passing the Coke Through a Boiler

OPECIFICALLY, this consists of a watertube boiler with four drums and a series of tubes connecting respectively the lower drums and the upper drums. Between these pairs of drums the coke passes over a series of steps or plates laid like the shingles of a roof. There is a space of ½ in. or so between successive "shingles," to permit the circulation of gases. The whole boiler is inclosed within a fire-brick-lined casing of steel plate and the axis is tilted 32 deg. from the horizontal. . This angle was determined by experiment as the one suited to the repose of fuel in a bed of the desired uniform thickness over the shingle plates. The original design had a pitch of 36 deg., which was enough beyond the angle of repose to cause the fuel to pile up in the lower end, instead of lying uniformly over the area.

Coke is brought by the regular coke car to the water-sealed door at the upper end. Here it is dumped into the boiler, where it remains for approximately an hour. At the expiration of this time it is dumped, through opening of the lower water seal, and carried away. One limitation is that the experimental conveyor at the bottom, and its piling facilities in the pit, have been found inadequate. This inadequacy is to be remedied by placing a second coke car under the boiler and carrying the charge away en masse. This will result in an opening of the lower water seal lasting not more than one minute.

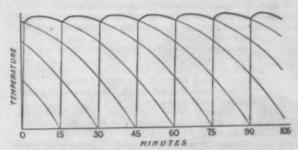
Extent of Cooling Depends on Economic Factors

OKE enters this boiler at about 1800 deg. and in the course of one hour has dropped to between 900 and 1000 deg. This is below the point of further combustion and is regarded as obtaining the maximum result from the process, consonant with the fixed charges on the investment. Coke could be held in the boiler until a much lower temperature was reached, and additional steam would be made from it: A higher evaporation per 1000 lb. of coke would ensue. If this were done, at twice the expenditure of time, it would require twice as many boilers to take care of a given amount of coke and the additional steam produced through the additional cooling of the coke might or might not make a paying investment.

At present this equipment is not in use, pending the new arrangement for disposing of the coke. The original design called for four of these boilers, the additional units to be installed after the experimental work had placed the first boiler in as nearly as possible an ideal condition. It is expected that this work will proceed during the coming summer.

Using four boilers in this way will avoid one inherent difficulty which results from the use of a single boiler. The temperature curve in the boiler rises to a maximum upon the entrance of coke and sinks slowly to a minimum by the time the coke is withdrawn. Steam production would naturally follow a similar curve. By charging four boilers seriatim, the resultant envelope curve, as shown below, would approximate closely enough to a straight line for practical

Auxiliary to this equipment is a device for the circulation of hot gases from one part of the boiler to the other. The suction comes from the top, above the coke pile, the fan forcing the gases into the bottom at a point of minimum temperature. This positive



Starting from Zero, Running Up to the Top and Then Curving Downward to "60" Is One Steam Cycle. By using four boilers, charged alternately, one every 15 min., the resultant steam curve is that shown in heavier line clear across the top of the diagram

circulation, which is similar in principle to that adopted in the Rochester plant discussed in THE IRON AGE of Feb. 10, will be of considerable assistance in speeding up the cooling of the coke and in transferring the heat from it to the water in the boiler. It is, however, not strictly necessary, as the apparatus functions satisfactorily, but at a slower rate, without it.

Preliminary Test Results

N a report last fall, through the Carbonization Committee of the American Gas Association, of which committee Alexander M. Beebee of the Rochester Gas & Electric Corporation is general chairman, the following figures were given for a test made last June on the U. G. I. quencher:

In the test, 349,346 lb. of coke was charged, together with 1313.5 cu. ft. of feed water at 54 deg. Fahr. A boiler pressure averaging 121 lb. per sq. in. was maintained. The evaporation factor figured out at 1.21 and the boiler hp. at 34.5. Evaporation of water was 235 lb. per 1000 lb. of coke. Figuring on standard conditions "from and at 212 deg.," this works out at 284 lb. evaporation per 1000 lb. of coke. A total

of 2.1 tons of coke was cooled per hour, while 16.4 hp. was developed per ton of coke per hour.

Coke from this plant, as well as that at Rochester, is entirely of domestic quality. No attempt is made to obtain metallurgical coke, as the demand for domestic coke is ample to call for all the supply. At Syracuse about one-fifth of the entire heating requirements of the population of the city is taken care of by coke from the gas works.

Improved Coke Quality

I N both cases, the coke is superior in several particulars to that obtained through wet quenching. It is of greater uniformity, both in color and in size of lump. It has not so many large lumps, but the belief is expressed that the average size of lump is a little larger than with wet quenching. There is a smaller proportion of fines. The coke is of greater strength, withstanding handling in a much better manner than the water-quenched coke. It does not break up so readily on being dumped, and, of course, it is dumped five or more times between pushing an oven and placing the fuel supply in the consumer's bin.

Incipient cracks in the lump, which on dumping waterquenched coke results frequently in a break-up into smaller pieces, seem to be almost absent in the dryquenched coke. At any rate, the trouble from that source is a minimum.

In the report mentioned above, six advantages of dry quenching are listed, as follows:

Less degradation of coke, owing to absence of "shattering" effect produced by water quenching.
 Fine appearance of coke, which is uniformly gray

and comparatively free from partly carbonized and discolored lumps

3. Value of high-pressure steam produced.

4. Saving of water used for quenching.
5. Absence of loose steam and of accompanying air-borne braize nuisance.

6. Better operation in screening plant, due to dryness of coke.

Improvement in the quality and in the appearance of coke, wtih reduction of braize, means a greater amount of salable coke. This gain has been estimated at 1 to 2 per cent. Improvement in working conditions about the plant, which is always of benefit, although not always measurable, makes another strong point for dry quenching.

Foundrymen Preparing for June Convention

Outline of Technical Program and Some of the Papers-Important Conferences on Foundry Pig Iron and Non-Ferrous Gating-Other Arrangements

THE program and papers committee of the American Foundrymen's Association announces preliminary plans for the technical and shop sessions for the convention to be held at the Edgewater Beach Hotel, Chicago, the week of June 6. The tentative program calls for the following sessions:

June 6.—Registration and committee meetings.

June 7.—Apprentice Training: Discussion of training methods pursued by shops operating successful apprentice courses.

Foundry Refractories: Discussion of refractories, June 8.—Pig Iron Qualities: Conference of pig iron producers and users on the qualities of pig iron and effect of using scrap in the blast furnace. Non-ferrous Shop Practice: Discussion of gating

and other shop problems. June 9 .- Foundry Costs: Conference on the local group method of securing uniform cost accounting methods

for foundries. General Foundry Practice: Discussion of Mold Drying. Analysis of defective scrap and other gen-

eral foundry problems. Steel, Gray Iron and Malleable Iron Sessions: Discussion of shop and metallurgical problems of steel, malleable and iron foundries.

June 10-Plant Visitation

Some of the papers to be presented at these sessions, with others to be announced later, are:

"Specifications for Miscellaneous Foundry Materials," by V. A. Crosby, metallurgist Studebaker Corporation, South Bend, Ind.

"Mold Drying," by J. M. Sampson, General Electric Co., Schenectady, N. Y. "Analysis of Four Hundred Tons of Defective Castings," by J. M. Haley, Crompton & Knowles Loom Worcester, Mass.

"Study of Chapleting," by M. Varlet, Sclessian, Belgium. Exchange paper of the Belgian Foundry Technical Association.

"Fatigue of Cast Iron," by H. F. Moore and S. W. Lyon, University of Illinois, Urbana, Ill.

"The Coulability Bar," by Charles Curry, Ardennes, France. Exchange paper of the French Foundry Technical Association.

"Some Graphite Formations in Gray Cast Iron," by J. W. Bolton, The Lunkenheimer Co., Cincinnati.

"Some Points of Steel Foundry Practice," by E. R. Young, Detroit Steel Casting Co., Detroit.

"Foundry Sand Control," by M. Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

Each morning breakfast gatherings of those interested in each branch of the industry will be held, thus presenting an excellent opportunity for making acquaintances.

One of the most important features of the convention will be the conference between pig iron producers The so-called deteriorating quality of pig and users. which has received so much discussion among foundrymen, will be brought up at this time. Representatives of the pig iron producers will be present to state their side of the case, and it is hoped that this meeting will bring about a better understanding of the respective problems between producers and users.
One phase which will be stressed is the so-called effect of the use of scrap in the blast furnace on the quality of the pig as affecting casting quality. Numerous opinions have been expressed on this subject but so far very few scientific tests have been conducted to bring out actual facts. This conference should prove of unusual interest to the cast iron and malleable foundrymen.

Conferences on Cost and Apprentice Training

The development of the use of uniform cost methods as fostered by the activities of local groups of foundrymen will be discussed at the foundry cost session. Representatives of foundry groups which are fos-tering this movement will be on hand to explain their organizations.

In addition to the apprentice training session, the F. A. apprentice committee is organizing local molding and pattern apprentice competitions. The castings and patterns which will be selected as the prize winners in the local contests will be shown at the Chicago convention and a committee of judges will select the best of these as prize winners in the national contest.

Plant Visitation and Other Arrangements

The location of the headquarters hotel, the Edgewater Beach, and the schedule of the sessions have been arranged to permit of extensive plant visitation. In addition, the opportunities presented by the Chicago industrial districts are exceptional, and it is felt that the visiting foundrymen will take full advantage of this chance to see those Chicago plants in which they are interested.

At a meeting of representatives of foundry interests, held in Chicago, March 15, W. J. Nugent, president Nugent Steel Castings Co., and Frank D. Chase of Frank D. Chase, Inc., were appointed chairman and vice-chairman respectively. A nominating committee was appointed to select various subcommittees to perfect arrangements for the reception and entertainment of convention righters and for other activities. of convention visitors and for other activities.

Alabama Ores Equal Lake Supply*

Reserves in Each District Close to Two Billion Tons -Birmingham Has Coal Enough to Smelt Its Iron Ore

BY ERNEST F. BURCHARD+

APS showing the areas of iron ore in the United States bring out some interesting geographic relations of these ores, particularly those of the Southern States. The Appalachian region, extending southwestward from New Jersey and Pennsylvania, lies chiefly within the Southern States of Maryland, Virginia, North Carolina, Tennessee, Kentucky, Georgia, and Alabama. The proximity in this region of deposits of iron ore, coal, limestone, and dolomite, all which are essential in making iron, has of course had a great influence in the early development and continuation of the iron industry there. Moreover, this region was one of the earliest in the United States to be settled, and together with the other Atlantic Coast farther north constitutes a large consuming States area. Other iron ore areas of the South are in regions of less relief, such as the western Tennessee River Valley, southeastern Missouri, and northeastern Texas, and the geologic history of the ores in these places differs from that in the mountainous territory.

The South contains some of the largest as well as some of the smallest units of the iron and steel industry. Districts in which iron mining and manufacturing have developed extensively are near Birmingham, Ala., near Chattanooga, Tenn., and in the valley of Virginia; but in the early days there were hundreds of small forges and furnaces scattered throughout the Until recently foundry and basic pig were made in this region at costs lower than elsewhere in the United States, but lately costs have greatly increased on account of wage adjustments. Practically the only blast furnaces in the South that are reached by iron ore from the Lake Superior district in normal times are near St. Louis, Mo., Wheeling, W. Va., Ashland, Ky., and Sparrows Point, Md., but the Maryland locality is dependent chiefly on foreign supplies.

Types of Iron Ore

The four principal types of ores of iron-hematite, or red and gray ore; limonite, or brown ore; magnetite, or magnetic ore; and siderite, or carbonate oreare all found in abundance in certain Southern ore fields, and the residue from the extraction of sulphur from iron pyrites is marketed as a low phosphorus iron oxide. The most valuable deposits of hematite in the South are the beds of Clinton or nearly equivalent Silurian age that crop out at points in west central Virginia and almost continuously from Big Stone Gap, Va., southwestward along the base of the Cumberland escarpment through eastern Tennessee and northwestern Georgia and terminate in the great deposits of the Birmingham district in Alabama.

Deposits of brown ore are common, particularly in valleys underlain by limestone and in the clays and sands of the Coastal Plain. Some of the best known deposits are in Virginia, Tennessee, Georgia, Alabama, deposits are in Virginia, Tennessee, Georgia, Alabama, and northeastern Texas. Magnetite is found in commercial quantities in the Appalachian region of Virginia, North Carolina, and eastern Tennessee, and in the Piedmont region of Virginia and North Carolina, and there is a deposit in central Texas. A bed of iron carbonate occurs on the top of a bed of coal in eastern Kentucky, and a had not associated with coal has been Kentucky, and a bed not associated with coal has been pened in northern Mississippi. In northeastern Texas nodules of iron carbonate occur below the weathered

zone in the brown ore deposits. Very little iron carbonate is used in the iron industry at present.

Birmingham District

Birmingham, Ala., the greatest iron center in the South, is second in rank in ore production in the United States; compares favorably as a producer of iron and Steel with Pittsburgh, Youngstown, and Chicago; and for reasons that are set forth below may prove to be the longest-lived iron mining district in the country. Its industrial history is, however, one of the shortest, as its beginnings date back only to the late sixties or since the Civil War. Noteworthy steps in the development of this district were the successful manufacture of pig iron with coke for fuel at the old Oxmoor furnace in 1876, the opening of the Pratt mines of coking coal in 1879, the making of open-hearth steel in 1899, and the present-day manufacture of iron and steel products of a great variety, thus bringing profits to the district that would otherwise be made elsewhere if the raw materials, coal and ore, or even pig iron were shipped away to be utilized.

The Birmingham district is an elliptical area about 75 miles long by about 40 miles wide. It includes extensive deposits of red hematite, large though less extensive deposits of brown and gray iron ores, and enormous areas of coking coal and fluxing dolomites and limestones. The city of Birmingham and its suburbs are in the valley between the Warrior coal field on the northwest and the Cahaba coal field on the

southeast.

Vast Beds of Red Ore

Red Mountain, which borders the valley on the southeast, contains the beds of red ore, which dip into the mountain at angles of 15 to 45 deg. and gradually become flatter as they extend under Shades Valley and Shades Mountain and the Cahaba coal field. beds are clearly of sedimentary origin and have not been altered essentially since their deposition. ore consists of amorphous red hematite mixed with calcium carbonate, silica, alumina, and minor quantities of manganese, phosphorus and sulphur. The workable portion of the main ore bed, known as the "big seam," ranges from 7 to 20 ft. in thickness and on the outcrop has been traced for more than 20 mi. In the underground basin drilling has indicated the presence of ore commercial grade at depths not exceeding 4000 ft. underlying probably more than 50,000 acres—a quantity of 1½ to 2 billion gross tons. The richest and most favorable places in the bed of ore have naturally been first selected for mining, and it is along the Red Mountain ore outcrop between Birmingham and its suburb Bessemer that the greatest mines are located, with the single exception of a mine near Shades Mountain in which the ore is reached by means of an inclined shaft cut through the overlying rocks to a depth of nearly 2000 ft. The mines on the outcrop have penetrated to distances of nearly a mile and a half from the surface openings and to vertical depths of 1500 ft.

In yield of iron the red ore is classed as of low

grade, but its property of being self-fluxing, or nearly so, through its content of calcium carbonate, goes far to offset its lack of high iron content, and the close proximity of the raw materials makes the cost of assembling them low, which is another feature favoring the use of ore of lower grade than is at present pro-duced in the Lake Superior district. Typical Red Mountain ore contains 35 to 37 per cent of iron (Fe), 10 to 18 per cent of silica (SiO₂), about 3 per cent of alumina

A paper read at the second annual industrial develop-line of the auspices of the Southern Division of the American Mining Congress. †U. S. Geological Survey, Interior Department.

(Al₂O₃), 10 to 20 per cent of lime (CaO), 0.16 to 0.30 per cent of manganese (Mn), 0.3 to 0.4 per cent of phosphorus (P), and 0.02 to 0.09 per cent of sulphur (S).

Limited Supply of Brown Ore

The brown iron ores consist of a mixture of hydrous iron oxides. The ore occurs in fine to coarse grains and lumps in irregular masses, inclosed in clay, sand, and gravel of Cretaceous and Tertiary age that overlie limestones and dolomites of Cambrian and Ordovician age. The deposits that have contributed mainly to the Birmingham furnaces occur at Woodstock and other places in Birmingham Valley, but ore is shipped in from more distant places, such as Russellville. of the deposits are 75 ft. or more in thickness and underlie many acres. The brown ore must be washed, picked and jigged to free it of clay, gravel and sand. Ore thus treated contains 41 to 54 per cent of iron (Fe), 10 to 20 per cent of silica (SiO₂), 2.25 to 6.5 per cent of alumina (Al₂O₂), 0.25 to 1.2 per cent of manganese (Mn), 0.20 to 1 per cent of phosphorus (P), and 5 to 7 per cent of combined water (H2O+). There are five open cut mines in the Woodstock district. The deposits are gradually becoming depleted, and the annual production, which reached a maximum of 535,332 tons of concentrates in 1915, is decreasing. Estimates of tonnage of brown ore are uncertain and unsatisfactory, but it does not seem probable that the district will in the future yield more ore than the total already mined, which is in the neighborhood of 15 million gross tons.

Talladega Gray Ore

A type of ore that has as yet been little developed is the specular hematite, or gray ore, that occurs in Talladega County about 40 miles southeast of Birming-ham. The ore is in bands a few feet to 15 ft. or more in thickness, interstratified with Cambrian (?) slate This ore has a linear extent of many and quartzite. miles in the Talladega Hills, and a large tonnage of ore easily accessible by railroad spurs has been indicated. This ore contains, according to an engineer's report, 45 to 53 per cent of iron (Fe), 15 to 26 per cent of silica (SiO₂), 2 to 4 per cent of alumina (Al₂O₃), 0.20 to 1.50 per cent of lime (CaO), 0.1 to 0.5 per cent of manganese (Mn), 0.007 to 0.4 per cent of sulphur (S), and 0.15 to 0.29 per cent of phosphorus (P). If the ore is susceptible to methods of concentration for the removal of silica a very high iron concentrate should result, which would enable the ore to compete with the red ore mined nearer the blast furnaces.

Iron Ore and Pig Iron Production

The Birmingham district ranks second to the Lake Superior district as a producer of iron ore. In 1925 its output constituted more than 10 per cent of the total for the United States and exceeded that of any of the Lake Superior iron ranges except the Mesabi. The year of largest production of hematite was 1925, when 6,312,207 gross tons was produced; the largest recent year for brown ore was 1915, when 535,332 tons of concentrates were produced. In production of brown ore Alabama ranks far ahead of all the other States, and the Birmingham district has usually produced 36.5 to 50 per cent of the State's annual output. The influence of World War demand was appreciable during 1915 to 1917, but the output of iron ore did not increase here in as large a proportion as in the Lake Superior district, because of the physical limitations inherent in underground mining of red ore and washing of brown

The total production of hematite in the Birmingham district from 1880 to the end of 1925 is more than 117,000,000 gross tons, and that of brown ore appears to have been nearly 15,000,000 gross tons, making a grand total of more than 121,000,000 gross tons of iron ore. The average value of red ore mined in the district in 1908 was \$1.09 a ton, and that of brown ore was \$1.37 a ton; in 1925 the corresponding averages were \$1.97 and \$2.82.

Since 1910 the production of pig iron in the Birmingham district has ranged between 1,062,201 gross tons in the dull year of 1921 to 2,453,823 gross tons in 1925. Market prices of Southern No. 2 foundry iron at Birmingham have fluctuated widely during this period. The quotations for the month of June show a range from \$9.55 in 1915 to \$42.30 in 1920; in 1925 and

1926 they were \$19 and \$21 respectively. The proportion of the Alabama total of pig iron produced by the Birmingham district in 1925 was about 87 per cent, and of the United States total about 6.6 per cent. A considerable part of the Birmingham pig iron is used directly as hot metal in the production of open-hearth steel.

Chattanooga District

The district of which Chattanooga, Tenn., is the center comprises eastern Tennessee, northeastern Alabama, and northwestern Georgia, and may be said to extend from Gadsden, Ala., and Rome, Ga., to La Follette, Tenn. Chattanooga occupies an exceptionally advantageous position for iron and steel manufacturing. The bedded red hematite tributary to its blast furnaces underlies parts of the great plateau areas, such as the Cumberland Plateau, Walden Ridge, Sand Mountain, Lookout Mountain, and Pigeon Mountain, and crops out in the bordering valleys. The outcrops of bedded ore in the three States aggregate more than 200 linear miles. Most of the outcrop has been worked for its soft ore, and much will be worked eventually for the hard ore, although only the thicker deposits are at present being mined-for instance, those near Rockwood, Cardiff, and La Follette, Tenn., and Attalla and Gadsden. Ala. At all these places there are blast furnaces which supply pig iron to foundries and other establishments at Chattanooga. Coal for the furnaces in this district is mined within a short distance, and at Rockwood the iron ore, coal and limestone are situated close together.

A very extensive basin of red ore is probably present 1500 to 3000 ft. below the Cumberland Plateau between La Follette and Elk Valley. On its outcrop the ore is about 4 ft. thick. The hard ore is high in lime and low in iron and for this reason has not been intensively developed, but if a need should ever arise for this ore probably more than 1 billion tons of it would be available.

Virginia

Brown ore, which comprises the well-known Oriskany replacement ore, as well as the "valley" and "mountain" ore, is the most abundant iron ore in Virginia, but there are also deposits of hematite and magnetite. The brown ore and hematite occur in the Appalachian region; the magnetite is found on the Piedmont Plateau. The principal deposits of Oriskany ore are in Alleghany, Shenandoah, Augusta, Botetourt, Pulaski, and Wythe counties. The thickness of the ore bodies is in places as much as 75 ft., but where mined is usually 15 to 25 ft. These bodies occur along the strike of the formation in series of pockets that extend down the dip of the rocks to depths of 300 to 400 ft. The mountain brown ores form a discontinuous narrow belt on the west slope of the Blue Ridge as pockets of residual ore in clay, some of which are 200 ft. in depth. Some of this ore is appreciably manganiferous. The valley brown ores occur in a belt bordering the mountain ores on the west and northwest and lie in irregular masses in clay on the uneven surface of Cambrian limestones. The hematite consists of two bedded varieties—specular and fossil. The specular hematite forms a bed 3½ to 6 ft. thick in Cambrian quartzite and shale in Botetourt, Bedford and Roanoke counties. The fossil ore is of Silurian age. In Lee and Wise counties the beds are continuous with similar beds near La Follette, Tenn. In Alleghany County the ore is softer and more or less ocherous.

In general it may be said that the deposits of iron ore in Virginia are so discontinuous and scattered that no great concentration of the iron industry has developed, although it has had a long and interesting life, dating from colonial days. Most of the ore is used locally, but some from the southern counties goes to Tennessee furnaces. The Oriskany ore deposits, although they have been most extensively worked, still give promise that other deposits remain to be discovered in the Massanutten Mountain district and between Alleghany and Wise counties. With greater refinements in concentration many unworked deposits of the valley brown ores will become of value, and the fossil hematite has not yet been thoroughly explored.

North Carolina

In the Appalachian region of western North Carolina two types of iron ore are mined-magnetite and

brown ore. The largest deposits of magnetite pass through Cranberry, Avery County, and extend into Carter County, Tenn. At Cranberry the ore has been mined since 1820. Since 1884 it has supplied ore, at first for a small blast furnace at Cranberry and of late years for a larger furnace at Johnson City, Tenn. The ore is notable because of its extremely low content of phosphorus and sulphur, and low phosphorus pig iron has long been made from it. The brown ores occur chiefly in the valleys of Cherokee and Madison counties. They are of relatively high grade and are shipped to blast furnaces in Tennessee.

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Western Tennessee River Valley

The western Tennessee Valley iron ore area comprises a narrow belt extending from Russellville, Ala., near Muscle Shoals, northward across west-middle Tennessee on the east side of the Tennessee River into western Kentucky. The ore is of the brown variety and is found in clay, sand, gravel and loose chert, overlying cherty Mississippian limestones. The region has long been a producer of iron ore and pig iron and is today producer of special irons such as ferrophosphorus, high-silicon iron, and charcoal iron. Two large by-product charcoal plants were built here during the World War, as large forests of hardwood trees are still available in this region. There is considerable unmined ore, and the district will continue to be a factor in the iron industry for many decades. Manuscript reports on this field are now in the hands of the Tennessee State Geological Survey and the United States Geological Survey awaiting publication.

Southeastern Missouri

Iron Mountain and Pilot Knob, in southeastern Missouri, are localities well known to the iron industry. Specular hematite was mined here on a large scale prior to 1890, and smaller quantities have been produced since then, but recently interest has been renewed by the finding of a considerable body of ore at Iron Mountain. Other deposits of specular hematite are found in the Ozark region, and in an outlying zone are many small deposits of brown ore. Ores from this region are consumed in blast furnaces in the St. Louis region, but the quantities produced have not fulfilled the demand, and ore from the Lake Superior district has been needed to supplement local production.

Northeastern Texas

Deposits of brown iron ore of proved value occur in Cass, Morris, Marion, and Cherokee counties, Texas, and deposits of possible future value in Upshur, Harrison, Anderson, and Henderson counties. These ores are not being mined at present, although in earlier years iron mining and manufacturing were carried on in northeastern Texas, one of the mines and blast furnaces having been operated by convict labor in connection with a cast iron pipe foundry. Prospecting has disclosed large reserves of ore in the region. Much of the material as mined by steam shovel will carry clay, sand, and gravel, which will necessitate cleaning, and experimental work has shown that it can be concentrated successfully. Experiments are being conducted on the lignite, immense deposits of which are available nearby, to determine its value for smelting the iron ore.

How Long Will Southern Coal and Iron Ore Last?

AMONG the questions of interest and importance to the American iron industry are those that concern the probable duration of the supplies of ore, coal, and other raw materials in the several districts, and the supplies that may be available from foreign sources when the domestic deposits are exhausted. The present scale of operations demands enormous expenditures of capital, and if raw materials in sufficient quantity to repay investments with good interest or profit can not be found it can hardly be expected that the funds necessary for the development of large mines and manufacturing plants will be obtainable. Records of mineral production extending over many years are available, but data concerning mineral reserves are less complete, although the need for them has long been recognized, and efforts have been made by Government and State geological surveys and by mining

companies to appraise these reserves quantitatively in certain of the more productive districts. Comparison of production records and estimated reserves affords a basis for estimates of the probable duration of the reserves under certain assumed conditions. Inasmuch, however, as these conditions are subject to change and as the estimates of reserves are subject to considerable uncertainty, any estimate of their duration is still more uncertain.

Attempts to estimate the ore reserves in Southern fields have been made in only the Birmingham, Chattanooga, and northeastern Texas districts, and only those of the Birmingham district will be discussed here. For the States of Minnesota and Michigan new estimates of iron ore reserves by ranges are available every year, and in these States it appears that almost as much new ore is discovered as is mined each year, the estimated reserve being thus at nearly the same figure, which is approximately 1½ billion tons.

Two Billion Tons of Birmingham Ore

No official estimates of ore tonnage have been made for the Birmingham district since 1909, when adequate drilling data were not available and certain assumptions concerning the thickness and extent of the ore beds in a large unknown area had to be used as a basis for the estimate. At that time the term "ore available under present conditions" covered very narrow limits as compared with mining practice of today, and the next 18 years may see equally great changes. Requirements as to quality are as high today as they were 18 years ago, and methods of beneficiation promise to enable them to be maintained, but underground mining has been so developed and extended that both the distance from the outcrop and the vertical depths are now twice as great as in 1909, and probably it is entirely justifiable to regard as available all ore that is self-fluxing, or nearly so, even though it is at depths between 2000 and 3500 ft. In October, 1924, in connection with the meeting of the American Institute of Mining and Metallurgical Engineers at Birmingham, the writer made an informal rough estimate of the red ore reserves based on newly available data. This estimate, which also involves many uncertain factors and is susceptible of much more refinement, indicated 1,470,000,000 gross tons of first grade red ore and 500,000,000 tons of second grade ore apparently available above a depth of or possibly 4000 ft., making a grand total of 1,970,000,000 gross tons.

Ore for 333 Years at Present Rate of Consumption

The question how long the Birmingham district may continue to mine iron ore and coal and to make iron and steel is of interest not only locally but to the industry in the United States and even in the world at large, for a certain British iron-master more than 30 years ago prophesied that Birmingham would dictate the price at which pig iron would have to be sold. The belief that it may prove to be the longest-lived iron-mining district in the United States is based on the very simple fact that as the ore is below the surface and has to be mined by underground methods and hauled out little by little through slopes the production can never be as rapid as that in the Lake Superior district, where ore is dug on an enormous scale hundreds of steam shovels and dumped directly into railroad cars within the open-pit mines. While the ore reserves in the two districts may amount to somewhere near the same quantity—possibly about 2 billion tons—the yearly output in the Birmingham district is only about 6 million tons, while that in the Lake Superior district is about 60 million tons, or ten times as great,

Moreover, in times of emergency, as in the world war, the output from the open-pit mines of Lake Superior district is capable of rapid and large increases, while that of the mines near Birmingham is more strictly limited by physical conditions. At the present rate of production, therefore, the iron ore reserves of the Birmingham district should be expected to last about 333 years, while those of the Lake Superior district would appear to be limited to about 33 years. The figures derived from these simple calculations may, however, be altered by other circumstances such as changes in the rates of production and consumption, the discovery of new ore bodies, improved methods of saving,

cleaning, and utilizing low-grade ores, and the use of scrap metal.

Coking Coal to Balance the Ore

Another question of vital importance to the iron industry is the relation of fuel to ore supplies geographically and quantitatively. The geographic relations are ideal for the Birmingham district, but if Birmingham had to bring coal from West Virginia or Pennsylvania the consequences to local industries would be serious, and as ore goes to coal rather than coal to ore the Birmingham ores might have to be shipped to Northern furnaces. The present outlook on this phase of the situation may therefore be given in closing this paper.

In the opinion of Charles Butts, of the United States Geological Survey, who has studied the geology of the Alabama coal fields in detail, the quantity of coking coal probably available in the Warrior field is more than 3½ billion tons, which should yield 60 per cent, or about 2 billion tons, of coke. To make a direct comparison between the tonnages of coke and the Birmingham red ore let us assume that 3 tons of iron ore would yield 1 ton of pig iron and that 1 ton of pig iron requires 1.8 tons of coke in its smelting. Then 1,500,-

000,000 tons of ore would yield 500,000,000 tons of metal, which would require 900,000,000 tons of coke.

If one-third of the coking coal estimated by Mr. Butts to be present were used for purposes other than the manufacture of coke there would still remain coal available to produce 1½ billion tons of coke, or more than sufficient to reduce the 1½ billion tons of ore estimated as available; and even if this quantity of ore were ultimately found to be as much as 2 billion tons there should still be sufficient coking coal to take care of the ore, provided that the requisite proportion of coal were held in reserve for coking purposes only. This provision seems to be the most important consideration in the whole problem, for probably more than one-third of the coal mined from the coking coal beds is sold commercially for steam and domestic purposes, and unless this usage is more strictly limited or controlled there is danger of a shortage of coking coal in advance of the exhaustion of the iron ore reserves.

The possibility may be kept in mind, however, of eventually using coal from other beds in the Warrior field and from beds in the Cahaba field that may be found to make coke less economically or of an inferior grade to that obtained at present.

Single Standard of Reinforcing Bar Adopted

Intermediate Grade of Billet Steel Chosen by Conference at Washington Under Auspices of Department
of Commerce

WASHINGTON, March 22.—The current intermediate grade of the American Society for Testing Materials was adopted as the single standard of billet stock reinforcing steel at a conference held here on Saturday of last week at the Chamber of Commerce of the United States under the auspices of the national committee of metals utilization, Department of Commerce. Director W. C. Wetherhill of the committee presided as chairman of the meeting, which was attended by 47 representatives of producers, users, distributers, technical organizations and the Department. The dates for clearing present stocks and putting into effect the adopted standard grade will be made by a committee named by Mr. Wetherhill.

The committee personnel is as follows: A. E. Lin-

The committee personnel is as follows: A. E. Lindau, American System of Reinforcing, chairman; E. F. Kenney, Bethlehem Steel Co.; C. F. W. Rys, Carnegie Steel Co.; C. Louis Meyer, Concrete Engineering Co.; O. W. Irwin, Truscon Steel Co.; Col. H. D. Sawyer, Associated General Contractors of America; O. L. Grover, American Association of State Highway Officials; LeRoy E. Kern, American Institute of Architects; J. J. Yates, Central Railroad of New Jersey.

The intermediate grade was adopted after A. E. Lindau, president American System of Reinforcing, Chicago, as chairman of the committee on grades, offered a motion that a single grade is desirable. motion was carried with one dissenting vote by C. F. W. Rys, of the Carnegie Steel Co., who appeared as a representative of the American Society for Testing Materials. He said that the society could not afford to eliminate grades for which there is demand, including structural and hard bars. Mr. Wetherhill, however, explained that the action taken did not nullify other grades and that so long as they were in demand the manufacturers necessarily would supply them. He pointed out that the program is intended as being educational, looking to the concentration upon a single grade and the ultimate elimination of the other grades. Time, it was said, would be given to clear existing stocks and the American Society will not be called upon to withdraw present specifications. After the program is made effective, Mr. Wetherhill said, the grades eliminated can still be produced upon special order, but the economies and benefits arising to producer, distributer and consumer can be expected to center demand on the single grade.

Mr. Lindau, in a preliminary statement, explained the survey made by his committee, which showed that distributers are almost unanimously in favor of adopting the single grade. Six members of the committee, he stated, favored one grade, two were non-committal and one did not vote. With regard to the grades required, five voted for the intermediate, two were non-committal and two did not vote. The motion for adoption of the single grade was made by George E. Routh, Jr., of the Kalman Steel Co., Chicago. The general discussion on both the question as to the desirability of adopting a single grade and what that grade should be was participated in by producers, users, distributers, architects, contractors, and technical representatives.

Differences of opinion were relatively slight as con-trasted with the widely divergent views that were ex-pressed at the meeting in January of last year to discuss the existing variations and specifications of billet steel reinforcing bars. J. J. Shuman, Jones & Laughlin Steel Corporation, Pittsburgh, suggested the setting up of limits on intermediate grade specifications while M. C. Shannon of the Gulf States Steel Co., Birmingham, said that 95 per cent of the demand coming to his company is for the structural grade and that adoption of the intermediate grade would increase costs, though he said he might agree if the limits were extended. Charles F. Stone of the Atlantic Steel Co., Atlanta, Ga., strongly favored adoption of the intermediate grade as the single standard. Mr. Lindau explained that a survey by the committee of which he is the head concerning demand of users showed 55 per cent required the intermediate grade, 35 per cent the structural grade and 10 per cent the hard grade. He said it was not sought to eliminate all specifications but rather to adopt a single grade with the hope that in the future, demand for such a grade will be 100 per cent.

Standard Would Prove Advantageous to Architects

It was pointed out by LeRoy Kern, technical secretary for the American Institute of Architects, that large offices of architects use great quantities of reinforcing steel and would be willing to have the material tested, while small offices of architects use only light quantities and would not want to incur the expense of tests; yet they must be assured that the material will not fail. Architects, he added, are practically unanimous in wanting one grade but do not know which one. The difference between the intermediate and structural grades was declared to be only slight, and the architects were represented as being willing to leave the

Testing Society Committees Confer

Annual Group Meeting in Philadelphia Results in Important Progress in Specification Framing— International Congress Next September

ABOUT 400 members of various committees of the American Society for Testing Material gathered at the Bellevue-Stratford Hotel in Philadelphia last week, March 15 to 18, in one of the society's regular group sessions of committees which have now become a fixed matter of policy. The meeting this year was the sixth one of this nature. The first one met at Pittsburgh in the spring of 1924, with the second at Washington in the fall of the same year. Philadelphia entertained the third meeting in the spring of 1925, and the fourth gathering was held at Cleveland in the fall of that year. Only one group meeting was held in 1926, which was the fifth one, at Providence, R. I., in March. Probably these meetings will be annual hereafter. Accounts of most of these gatherings have appeared in THE IRON AGE. Some of the features of the work last week of a few of the chief metal committees are here given.

for Testing Materials were represented at the annual group sessions held in Philadelphia last week. In most cases the meeting of the full committee was preceded by sessions of various sub-committees. The metal committees which were scheduled on the program were A-1 on steel, A-3 on cast iron, A-5 on corrosion of iron and steel, A-6 on magnetic properties, A-8 on magnetic analysis, B-2 on non-ferrous metals and alloys, B-3 on corrosion of non-ferrous metals and alloys, B-4 on metallography, Section E-1 on thin sheet metals and Section E-1 on tension testing.

There was also a session during the week of the joint research committee on the effect of temperature on the properties of metals and a meeting of the committee on gray iron of the American Foundrymen's Association. More committees participated in the sessions last week than ever before, and it was the largest group meeting ever held by the society.

Interest in Cast Iron

A WELL-ATTENDED meeting of committee A-3 on cast iron decided to recommend to the society at its annual meeting in June that the specifications covering the new arbitration bar be made tentative, and that the specifications for the chemical analysis of pig iron and cast iron be adopted as a tentative standard.

In view of the fact that at the International Congress for Testing Materials, which is planned to be held in Amsterdam, Holland, in September, the question of closer understanding among the nations on cast iron and pig iron may come up, the committee passed a resolution suggesting to the executive committee of the society that committee A-3 appoint a subcommittee on international relations so that those on the committee would be clothed with considerably more authority when discussing such questions abroad.

The sub-committee on impact testing of cast iron, the importance of which has been called attention to for some years, reported that it had discussed a method of starting work on this subject, and that drop and

Considerable attention was given to the question of high-test cast iron, the sub-committee on this sub-ject having held an interesting and profitable session previous to that of the full committee. At this meeting the question of raising the specifications of this particular grade of iron 10 per cent for both tensile and transverse tests was thoroughly discussed, as well as the value of the tensile strength test. It was suggested that the utility of this test had not been tried out, and that it should be further investigated, either

separately or in relation to the transverse test.

Considerable attention was given to the relative merits of the short and the long bar for tensile tests and the character of fillet which should be used. In consideration of the shear test it was the opinion of those present that this offers certain advantages as a method of testing high-test iron, and further study of its value was recommended. The chairman of this sub-committee, J. W. Bolton, Lunkenheimer Co., Cincinnati, was authorized to draw up a program for future work based upon the discussion at this session. A classification of the meaning of "high-test" iron was also discussed.

An important program of fatigue tests has been arranged through the cooperation of Prof. J. B. Kommers of the University of Wisconsin, who has offered to make for the committee a series of fatigue tests of three kinds of cast iron: Tractor iron to be supplied by Deere & Co., Moline, Ill.; pipe iron, to be supplied by the American Cast Iron Pipe Co., and high-test iron for engine castings, to be supplied by Aflis-Chalmers

Refining Steel Specifications

WITH Chairman J. B. Young, engineer of tests, Reading Co., Reading, Pa., presiding, committee A-1 on steel held a largely attended meeting Friday, March 18, at which it finished up its year's work preparatory to the presentation of its annual report at the convention in June.

The proposal to cooperate with the American Railway Association in an investigation of the effect of inclusions in forgings was reported as having been accepted by the A. R. A. committee and joint consideration of this problem by the two bodies is being arranged.

The principal time of the committee was taken up with reports of various sub-committees which had held meetings on previous days of the week, or at some previous time during the year. Some of the chief matters of interest in this field are the following:

Steel Castings for High Temperature Service.—This was one of the most important topics discussed by committee A-1. Formal communications from certain groups of manufacturers of steel castings were received by the committee, in which they requested that the committee reconsider its action at a previous meeting, approving certain revisions of the tentative specifications for carbon steel castings for valves, flanges and fittings for high-temperature service (A 95-26 T), resulting in the elimination of the converter and crucible processes as permissible under the specifications

and in the fixing of certain chemical limitations. These revisions had been proposed by sub-committee XXII on pipe, flanges and fittings, with the recommendation that the specifications as revised be continued as tentative. After a very full discussion, the committee decided not to reconsider its previous action but referred the communications to the sub-committee for report during the coming year.

Structural Steel for Bridges, Buildings and Rolling Stock.—Sub-committee II has had under consideration for some time a combination of the two present standard specifications covering structural steel for locomotives and the one covering structural steel for cars. The result has been that the sub-committee presented combined specifications which embodied a number of modifications which bring these into line with those of the American Railway Association. These specifications will be recommended to the society in June for publication as tentative. Decision was also reached to recommend to the society the advancing to standard specifications of the tentative specifications for structural silicon steel (A 94-25 T).

Commercial Bar Steel.—Slight revisions in the present tentative specifications for commercial quality hot-rolled bar steels (A 107-26 T) were approved upon recommendation of sub-committee XV and then decision was reached to recommend the advancement of these specifications to standard, withdrawing at the same time the three present specifications of the society for cold-finished Bessemer steel automatic screw stock (A 32-24), for cold-finished open-hearth steel automatic screw stock (A 54-24) and for commercial bar steels (A 80-24).

Structural Steel for Ships.—Sub-committee III proposed tentative specifications for marine boiler steel which embodied revisions of a specification that had been acted upon by committee A-1 a year ago and subsequently withdrawn from its 1926 report to the society. In the preparation of these revised specifications, the sub-committee has cooperated with the boiler code committee of the American Society of Mechanical Engineers, the American Marine Standards Committee, the Steamboat Inspection Service and other agencies interested in marine boiler steel. Specifications will be recommended to the society for acceptance as tentative in June.

Other committees which made brief reports, consisting principally of revisions in present specifications, or the advancement to standard of certain tentative specifications, were sub-committee I on rails and accessories, sub-committee IX on steel tubing and pipe, sub-committee XIX on sheet steel and sub-committee XXI on steel for welding.

Corrosion of Iron and Steel

AT a well-attended meeting of Committee A-5 on corrosion of iron and steel, J. H. Gibboney, chief chemist, Norfolk & Western Railway Co., Roanoke, Va., chairman, reported that the important series of atmospheric tests on bare sheet steel, which has been in progress for ten years, is still giving results of value at two locations and that the Pittsburgh series was concluded some time ago under conditions of greater severity. This important series has pointed out the value of small amounts of copper, alloyed with steel, for certain classes of weathering service. A second important field of investigation is now definitely under way at five localities, and at each site complete sets of zinc-coated sheets have been installed and coated wire fencing and general hardware and structural shapes, which are normally exposed to the atmosphere, are being collected and will probably be installed shortly. It is expected that it will take ten years to complete these tests.

Parallelling the field tests, the committee is studying methods of tests which have for their object the detection of mechanical or manufacturing faults in the production of zinc-coated products.

Other tests are being made upon various classes of iron and steel to determine their resistance to corrosion such as prevails in under-water service of a seawater, fresh-water or brackish type. The results are expected to be of value in determining the merit of various kinds of ship plate, the quality of rivets and the influence of riveting upon corrosion.

A new sub-committee has been formed composed of four manufacturers' representatives and six men from highway, railroad and public roads service to inaugurate a program dealing with the testing and serviceability of metal culverts.

Committee A-5 has steadily grown in membership until the total is now something over 100, made up of representatives of the most important producing and consuming companies in the country.

Work in Magnetic Testing

COMMITTEE A-8 on magnetic analysis received reports from various members who are developing apparatus for inspecting steel and steel products by means of magnetic methods. One method of examination in particular was described which promises to be of exceeding value. It uses the newly developed cathode ray oscillograph for the comparison of material under test with specimens which have been selected as standards. The committee agreed that it was desirable to present a paper on the subject of magnetic analysis at the International Congress for Testing Materials in Amsterdam next September and that it would favor sending a delegate to represent the two committees of the society interested in the magnetic field.

Committee A-6 on magnetic properties reviewed its tentative methods of test and expects to recommend these for advancing to standard with some modifications consisting of the addition of new requirements in some of the tests. Thomas Spooner, research engineer Westinghouse Electric & Mfg. Co., Pittsburgh, is chairman of this committee. The committee is now formulating definitions for a number of terms used in magnetic testing and hopes to present these at the approaching meeting. A new sub-committee on tests at high values of magnetizing force is being organized.

New Specifications for Non-Ferrous Metals

A CTION on several new specifications which committee B-2 will present to the society this year was recorded by the committee, which held a largely attended meeting last week. These include new tentative specifications for copper tubing for refrigerators, for brazing solder, for yellow brass castings and for strip zinc. Several important revisions in present specifications are to be recommended. Besides, the committee is developing specifications for fire-refined copper, for manganese metal for use in the deoxidizing of non-ferrous metals and for silver solders.

The sub-committee on aluminum alloys has a very extensive research and testing program under way covering the testing of aluminum die castings, which will comprise tensile, impact and hardness tests of some 70,000 specimens. This will probably be the largest program of physical tests on die castings ever attempted.

International Testing Congress Planned

MONSIDERABLE interest was manifest and a good deal of discussion was heard concerning an announcement of the executive committee regarding an international congress to be held next fall. The announcement is to the effect that the Dutch and Swiss associations for testing materials, acting upon an agreement reached at an international conference held last September in Zurich, have issued invitations to an International Congress for Testing Materials to be held Amsterdam, Holland, Sept. 12 to 17, this year. The proposed congress is expressive of a practically universal desire to resume the international cooperation in the domain of testing materials interrupted by the world war in 1914. The committee recalls the work of the International Association for Testing Materials with which the society was affiliated and in which some 600 of its members had personal membership. It is be-lieved that an effort will now be made to reorganize the international association.

The executive committee of the society has accepted the invitation to participate in the congress, having for some time believed that international cooperation is desirable and should be resumed whenever the European nations are prepared to join hands again in this work. It is planned to have one or more official delegates to the congress and in addition to arrange for

the presentation of reports and papers upon certain of the following topics which have been announced for discussion at the congress:

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Special steel, metallography, endurance tests, influence of high temperature on the properties of metals, magnetic and electric properties of metals, abrasion testing, hardness testing, impact tests, slag inclusions, cast iron welding and capability of being welded.

The program also includes various subjects in the cement and concrete field, as well as a few miscellaneous topics, such as oils, copper, wood and preservatives against corrosion.

The president of the A. S. T. M. has appointed a special committee under the chairmanship of T. D. Lynch, Westinghouse Electric & Mfg. Co., Pittsburgh, which is to have charge of plans for the society's participation in the congress. As a first step, each standing committee has been informed concerning the congress and requested to make suggestions as to what topics it would like to see presented there by American delegates. This request was discussed by several of the committees last week. The replies received will largely determine the American participation in the program, it is stated, and it has been tentatively planned to lay special emphasis upon subjects such as special steels, metallography, endurance tests, properties of metals at high temperature, and magnetic and electric properties of metals. The society would like to hear from any members who may plan to attend the congress.

Plans for the Annual Meeting

PLANS are maturing for the thirtieth annual meeting of the society, which is to be held this year at the French Lick Springs Hotel, French Lick, Ind., June 20 to 24. The meeting in the interior of the country this year is to satisfy a demand that has been in evidence for some years; it will also be somewhat experimental. Indications are that the attendance will be large, but possibly not so large as at recent meetings at Atlantic City. The first day, June 20, will be devoted to committee meetings and the regular program will start on Tuesday, June 21. The provisional program for the week will be available late in April. Reduced railroad rates have been arranged on all roads and round trip tickets will be sold at one and one-half single fare to holders of identification certificates secured through the society. These will be mailed to members about the end of May.

The annual meeting this year represents the twenty-fifth anniversary of the incorporation of the society and this will be observed by holding an anniversary dinner arranged by the regular committee at annual meetings. Appropriate recognition will be made of those members who have been continuously members of this society since its incorporation.

Miscellaneous Features

 $S^{\rm OME}$ of the important miscellaneous meetings of committees and announcements of the society follow:

Joint Investigation of Metals at High Temperatures

At a meeting of the joint research committee on the effect of temperature on the properties of metals, additional reports from cooperating laboratories were received and the results were compared with those already in hand on identical materials. Some interesting and important facts were observed concerning the comparison of results obtained by the various laboratories. Final conclusions on this subject will not be available until the remaining reports on these materials have been received and coordinated. Consideration was given to the proposed future program of extending laboratory work to cover physical and other characteristics of metals at high temperatures, other than those now in progress. Current titles were received for the bibliography which is being compiled by the committee, primarily for the use of members in following developments on these subjects. The committee's next meeting will be held in connection with the annual convention of the society at French Lick, Ind., in June.

Foundrymen's Committee on Gray Iron

During the meeting last week, the committee on gray iron of the American Foundrymen's Association,

J. T. MacKenzie, chief chemist, American Cast Iron Pipe Co., Birmingham, chairman, held a session. Particular consideration was given to the matter of inaugurating a program of research on pig iron and cast iron and also the printing of a bibliography on this subject, together with a digest of some of the important work which has been done as represented by the various articles in the bibliography.

Heat Treatment Definitions Agreed Upon

Announcement is made that the joint committee on definitions of terms regarding heat treatment, upon which the Society of Automotive Engineers, the American Society for Steel Treating and the A. S. T. M. are represented, has unanimously reported definitions for a number of terms, among the more important of which are heat treatment, quenching, hardening, annealing, (normalizing, spheroidizing, tempering, malleabilizing, graphitizing) case hardening, (case, core) and cyanidizing. The executive committee has referred this report to committee A-4 on heat treatment of iron and steel, which committee is now balloting on these definitions for submission to the society in June as tentative ones.

A Research Fund Established

The executive committee, at its meeting in January, created the A. S. T. M. research fund by investing \$1,000, the approximate amount of the entrance fees received in 1926, in such a fund and further adopted the policy of investing annually in the fund half of the entrance fees.

Industrial Survey of New England in Two Concise Pamphlets

The Boston Chamber of Commerce, as a sequence of its recent survey of New England industries, particularly those pertaining to the metal working field, has issued two studies on improving manufacturing facilities. The first one deals with general topics, and contains 52 pages of useful information to New England as well as manufacturers in other sections of the country. The second book, or pamphlet, is of 58 pages and deals with the technical side of the subject.

Both issues are the result of the chamber's bureau of commercial and industrial affairs. Organized to cooperate with existing establishments in promoting better management methods; to bring to Boston and to New England additional industries and greater volume of foreign and domestic trade, and to furnish reliable information regarding industrial conditions, the personnel of this committee included a diversified list of leaders in their particular fields including Harry D. Carter, Florence Stove Co.; Ernest B. Freeman, Sturtevant Co.; Alfred C. Howell, Ames Shovel & Tool Co.; George A. Sagendorph, Penn Metal Co.; Raymond L. Tweedy, Manufacturers' Research Association, and Charles B. Burleigh, General Electric Co.

In connection with this work there was an industrial planning committee, consisting of 28 members, and including: J. H. Barber, Welworth Co.; Marcus Chase, Niles-Bement-Pond Co., Boston; John C. Connelly, Dennison Mfg. Co., Framingham, Mass.; A. H. D'Arcambal, Pratt & Whitney Co., Hartford, Conn.; and Everett A. Greene, Lockwood, Greene & Co., Boston, engineers.

This industrial planning committee has placed before its readers concise methods in measurements of productive performance; manufacturing control; routing, scheduling and dispatching; advances in internal transportation; modern metal working machinery; small tools and gages; and improving human relations, all vital subjects for the manufacturer today. The subjects, as treated, are basic primarily, in simple. understandable language for the executive as well as the foreman or layman. Chapter V, in Vol. 2 (Technical) is by Marcus Chase, Niles-Bement-Pond Co., Boston. It deals with modern metal-working machinery, including lathes, milling machines, grinding machines, planers, drilling machines, boring machines, motor drive and other general topics of interest.

Mr. D'Arcambal, Pratt & Whitney Co., contributes a chapter on small tools and gages, dealing with recent improvements of small tools and gages, and with standardization. The Boston Chamber of Commerce makes a nominal charge for the two issues.

General Rate Inquiry Begun

Pittsburgh Hearings Held in Broad Investigation of Iron and Steel Rate Structure in Official Classification Territory

PITTSBURGH, March 21.—Since the so-called Jones & Laughlin freight rate case has been combined with a number of others into Interstate Commerce Commission Docket 17,000, Part 6, constituting an investigation into iron and steel freight rates in Official Classification territory, or that area bounded by the Mississippi River on the west, the Ohio and Potomac rivers on the south, Canada on the north and the Atlantic Ocean on the east, it is not surprising that hearings in Pittsburgh, which started on March 16 and are continuing this week, should attract an attendance of about 300 iron and steel shippers, railroad men and representatives of State public utility boards. It is also natural, in view of the broad and general character of the investigation, that the hearings no longer center on what Pittsburgh district iron and steel manufacturers have to contend with from the more favorable freight rate charges said to be enjoyed by Chicago district producers.

That was the basis of the Jones & Laughlin case, from which the present investigation arose, but it developed at Thursday's and Friday's sessions that Pittsburgh district steel makers are now just as much concerned over what they regard as the favored position as to freight charges enjoyed by the Eastern and Seaboard companies. This phase was brought in by F. A. Ogden, traffic manager Jones & Laughlin Steel Corporation, and John A. Coakley, division freight agent American Steel & Wire Co., Cleveland, testifying for the United States

American Steel & Wire Co., Cleveland, testifying for the United States Steel Corporation subsidiaries. The breadth of the hearing also was emphasized at the first session, when the representative of the New England railroads announced that on April 7, the roads of that section would file a brief, abrogating as of May 16 the commodity rates in effect on iron and steel articles, chiefly wire products produced in and near Worcester, Mass., and substituting, with few exceptions, class rates.

Johnston B. Campbell, commissioner of the Interstate Commerce Commission, is presiding at the hearings, thus emphasizing their importance. All previous iron and steel freight rate hearings held here have been before attorney examiners of the commission. With Commissioner Campbell are Howard C. Faul, senior examiner under Mr. Campbell, and C. M. Bardwell, senior examiner on the staff of the chief examiner for the commission

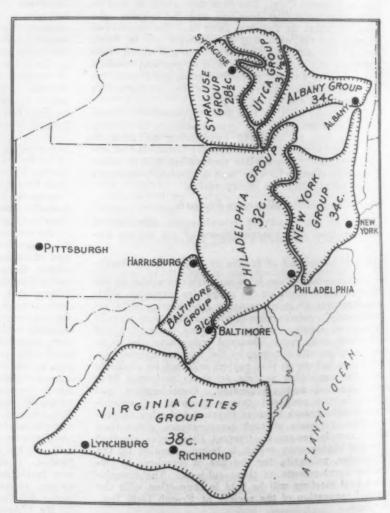
Exhibits Show Common Rate Groups

The first session was given over chiefly to the introduction of freight rate data, compiled by the railroads at the request of the commission, R. N. Collyer, chairman Trunk Line Association, New York, offered rates now in effect in Trunk Line Association territory and their history from July 1, 1913, together with maps outlining the groups having a common rate from various producing dis-R. M. Kinney, representing the New England railroads, entered and explained rates in that area, while a par-tial presentation of rates in Central Freight Association territory was made by E. H. Garrison, Chicago, representing railroads in that region. C. W. Galligan was witness for the Illinois Freight Association. Cross-examination was limited and, except for the correction of minor errors in rates, failed to bring out that in presenting the data the railroads were doing more than following the order of the Interstate Commerce Commission.

F. A. Ogden, traffic manager Jones & Laughlin Steel Corporation, was on the stand most of the second day of the hearing and advanced the contention that Pittsburgh should have rates measured with the same yardstick that is used in other steel-producing centers. He introduced 10 exhibits to show the discrimination under which Pittsburgh producers are said to labor. Pittsburgh pays 100 per cent of the fifth class rate to New York, Bethlehem pays 58 per cent, and Philadelphia, 68 per cent. On westbound traffic Boston, with a commodity rate to St. Louis, pays 47½c. per 100 lb., against a fifth class rate from Pittsburgh of 40½c., although the distance from Boston is almost double that from Pittsburgh.

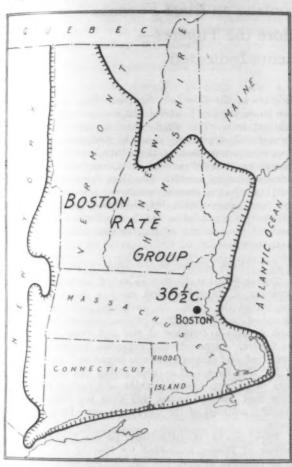
Says Competitive Conditions Overemphasized in Present Rates

Mr. Ogden suggested that rates should be based on the service rendered by the carriers, with the factor of mileage given more weight; that the rates for each producing district should be fixed with a regard to existing local conditions, and that there should be less regard for competitive conditions, which are overemphasized in the present rate structure. He believes



In Each of the Areas Enclosed by Shaded Lines There Is a Common Freight Rate on Finished Iron and Steel from Pittsburgh. For example, the rate from Pittsburgh to destinations in the New York group is 34c. per 100 lb.

that the Interstate Commerce Commission should abandon control of rates within a switching district. He also suggested an alternative minimum weight scale, with a rate on 36,000 to 40,000 lb. of 85 per cent of the existing fifth class rate and on 80,000 lb. or more a rate of 70 per cent of the present fifth class rate. It was brought out in cross-examination that on the larger weight the suggestion would mean a rate of



In the Boston Rate Group, Which Includes Most of New England, the Common Freight Rate from Pittsburgh Is 36½c. per 100 Lb.

24c., instead of the present rate of 34c. per 100 lb., to Chicago from Pittsburgh.

Questioned as to river transportation, Mr. Ogden said that when the Ohio River is open to year 'round navigation through the completion of the locks and dams now under construction, Pittsburgh shippers will have competitive advantages in some parts of the West, independent of the railroads. He said that river shipments are now possible only from October to June each year and that the annual movement by his company on the inland waterways amounts to between 35,000 and 37,000 tons, out of a total production of 2,000,000 tons or more.

Mr. Ogden was on the stand again on Friday morning for completion of his cross-examination, not finished on Thursday. Among other discriminations in rates which Pittsburgh suffers, according to his testimony, is the fact that, although much nearer, it has the same rate to Virginia cities as Syracuse, N. Y., or 28½c. per 100 lb.

Suggests Rate of 251/2c. from Pittsburgh to New York

John A. Coakley, who followed Mr. Ogden on the witness stand, besides presenting a mass of data illustrating the effect of the present rates upon the iron and steel industry in Pittsburgh, observed that the "railroads serving the district have made the same mistake in iron and steel they have made in the coal industry, with rates which have driven away from Pittsburgh its coal traffic to the Lakes and have deprived Pittsburgh of its geographical advantage in proximity to the Lake markets."

He offered a complete schedule of rates on steel prepared on behalf of the Steel Corporation, which among others proposes a rate of 25½c. per 100 lb.

from Pittsburgh to New York, which he said, is justified by the rate now enjoyed by the Bethlehem group to Eastern points. He pointed out that the rate from Sparrows Point to New York is 14½c. per 100 lb., as compared with 34c. from Pittsburgh. To show the development of discrimination in rates against Pittsburgh, Mr. Coakley produced a table indicating that the present rate of 34c. from Pittsburgh to New York is 234 per cent of the 1903 rate of 14½c., while the existing Harrisburg-New York rate of 19c. is 211 per cent of the 9c. rate of 1903 and the Bethlehem-New York rate of 14½c. is 161 per cent of the 9c. rate of 1903.

At today's session John A. Coakley was on the stand for a brief period for cross-examination and was followed by E. B. Thomas, president United States Steel Products Co., who presented a group of exhibits intended to illustrate the discriminatory character of export rates against Pittsburgh. These showed a great percentage of increase in the export freight rates since 1903 from Pittsburgh as compared with those from other Eastern shipping points.

Gain in Pittsburgh District River Traffic

February commerce on the Allegheny, Monongahela and Ohio rivers reached a total of 2,827,860 net tons, the monthly report of the United States Engineers' Office at Pittsburgh discloses. This is a gain over January of 181,243 tons. The movement of coke went down sharply, but in other commodities gains were registered, the most notable one being in coal. There was a gain of more than 4000 tons in iron and steel shipments.

The figures in net tons follow:

Commodity	gheny River	gahela River	Ohio River 497,380	Total 2,444,624
Coal	19,000 13,000 27,725	1,928,244 40,697 55,900	4,950 34,624	58,647 118,249
Packet cargo	24,750	48,400 29,529 14,788	4,008 48,204 29,211 6,320	4,008 121,354 58,740 22,238
Total Total for January, 1927	85,605 89,242	2,117,558 1,935,879	624,697 621,496	2,827,860 2,646,617

Pig Iron Rates to Connecticut Sustained

WASHINGTON, March 22.—Dismissing a complaint made by the Farrel Foundry & Machine Co., Ansonia, Conn., the Interstate Commerce Commission in a decision made public last week held that rates on pig iron in carloads from points in Alabama, Kentucky and Tennessee to Ansonia are not unreasoable or otherwise unlawful.

Steel Furniture Shipments

Washington, March 22.—Steel furniture stock goods shipped in February were valued at \$2,690,227, as compared with \$2,730,714 in January, according to reports to the Department of Commerce from 33 manufacturers in the "business group." Shipments of steel shelving in February were valued at \$607,622, compared with \$555,996 in January, based on reports from 15 companies. New orders in the "business group" in February were valued at \$2,777,633 and unfilled orders at \$1,805,848. New orders in shelving were valued at \$658,947 and unfilled orders at \$675,201.

In both groups February shipments and new orders were a little ahead of last year.

Will Observe Oil Power Week April 18-23

Oil power week will be observed April 18-23 by meetings throughout the various cities of the country for the purpose of focusing general attention on the production of power by the use of oil. The national committee in charge of the week's activities announces that a prize will be awarded for the best contribution toward the advancement of oil engines either in the form of a paper presented at one of the meetings held during the week or as a written discussion of a paper by anyone attending the meetings. Edgar J. Kates, 29 West Thirty-ninth Street, New York, is chairman of the committee.

More Iron from Wide Hearths*

Influence of Oxidation Phenomena on Blast Furnace Process—Reactions Before the Tuyeres— Possible Improvements Indicated

A LECTURE on "The Influence of Oxidation Phenomena on the Blast Furnace Process" was delivered recently by Dr. F. Wuest, of Düsseldorf, Germany, before the general session of committees of the Verein deutscher Eisenhüttenleute. In the production of iron it is necessary to distinguish principally between reduction and oxidation processes, and it is rare that either one can be carried through practically without interference by the other. The result of these concomitant adverse, and in part not fully understood, reactions is a poorer and more costly product.

A study of the oldest of iron-making processes, that of the Catalan forge (Rennfeuer) which is entirely reducing in character, and the charcoal-hearth processes (Frischfeuer), which are first reducing and then oxidizing, show that the first-named process, with its packed charcoal hearth and fine ore charges, yields metal made under perfect reducing conditions—not equaled by the blast furnace, whereas in the charcoal-hearth processes, in spite of the molten pig iron trick-ling through the loosely heaped incandescent charcoal, there is sufficient oxidation to convert it to wrought iron. A comparison of the two processes shows that it is the action of the gas phase which determines the outcome of the process and not the solid fuel phase.

In the blast furnace, the crucible and lower portion of the hearth are filled with small and large pieces of incandescent coke, through which the drops of iron coming from above pass into the accumulation of molten material. These drops cannot fall directly, but are hindered in their descent by the lumps of coke and the drops of slag also coming down, so that it takes considerable time and affords long contact with the solid carbon and gas phases existing there. The solid carbon phase can add any deficiency of this to the iron commensurate with its composition, as well as reduce any iron oxide that may yet be in the slag.

Effect of the Gas Phase on the Fluid Phases

The effect of the gas phase upon the two fluid phases—the iron and the slag—cannot be determined until the nature of the gases before the tuyeres is known. When the blast strikes the incandescent coke, the great excess of oxygen present is first converted to carbon dioxide, and this in turn becomes carbon monoxide; this conversion proceeds faster as the blast temperature rises, as the fuel is more porous, or in smaller pieces and more densely packed. Any moisture in the blast is decomposed at similar rates of speed.

Every tuyere, therefore, has before it a region in which oxygen, carbon dioxide and steam co-exist, whereas toward the center of the crucible there will be only carbon monoxide and nitrogen. Concerning the extent of this oxidizing gas phase inward and upward there is little information at hand. Nor is there any action on the slag here, as this consists of non-oxidizable calcium-aluminum silicates.

The highly-heated oxidizing gas phase, however, has a powerful action upon the finely divided drops of molten iron, which action is in turn neutralized as fresh pieces of incandescent fuel are touched, only to be re-

oxidized as the drop falls further. Since the oxidizing gas phase is more powerful, the end reaction will mean oxidized iron. The slag takes up this iron oxide formed and, depending upon the temperature and degree of concentration of the silicon, carbon and manganese compounds present in the molten iron, these become reducing agents. The blast furnace has, therefore, to effect a double reduction, first in the upper part and again within the crucible. Thus the chemical energy expended in the first reduction is partially lost and the capacity of the furnace must be affected disadvantageously.

Free Oxygen in the Blast Furnace

Doctor Wuest states that he called attention to this situation in 1910 but that no one gave it serious thought at the time. As early as 1893, van Vloten furnished proof that free oxygen existed within the blast furnace a distance of two feet from the end of the tuyere. Carbon dioxide extended inward as far as three feet, and carbon monoxide began to form at about 22 in. The curves of a table giving the volume relations of oxygen, carbon dioxide and carbon monoxide show that the last-named gas does not form in any quantity until all of the oxygen is gone from the gas phase.

More recent investigations by the United States Bureau of Mines, conducted by Perrott and Kinney, on 10 furnaces in 1923 and two in 1925 have amplified the deductions of van Vloten and, being conducted with larger furnaces, the penetration of oxygen was found to be 28 in., with carbon dioxide extending inward three feet. The investigations of van Vloten and Perrott and Kinney give unquestioned proof of the existence of an oxidizing gas phase in front of the tuyeres of the blast furnace. This can also be demonstrated mathematically by the volumetric relation of nitrogen to oxygen in the regions involved. For every 1000 volumes of nitrogen in the blast, there must be 265 volumes of oxygen present. The same proportion of nitrogen to oxygen must exist within the furnace within the tuyere regions, provided only carbon has united with the oxygen. When, therefore, we find that some oxygen has disappeared, it can only have gone to the liquid phasesor to the molten iron, to oxidize it. On the contrary, should the proportion of oxygen to nitrogen have gone above the standard, it would show that iron oxide in the slag has been reduced and the gases were thus enriched.

Analyses Show Reactions Before the Tuyeres

A table of 29 analyses of such gas relations is given by the author, in which losses of oxygen from 23 per cent to gains of up to 58.9 per cent are recorded, showing the extent of the reactions before the tuyeres is oxidation of the iron, and further toward the center the reduction of the iron oxide in the slag. A number of reasons are given why the enrichment of the oxygen proportion toward the center of the furnace should take place, and the deduction is made that, for the cases in question, the blast did not penetrate into the furnace further than three feet.

In this connection it is highly interesting to note, from the Bureau of Mines' experiments, that the very much slower moving column of gases in the center of the furnace are so enriched in oxygen content that the

^{*}Abstract from the German, prepared by Dr. Richard Moidenke, Watchung, N. J.

carbon monoxide went as high as 70 per cent, whereas theoretically it should be but 34.7 per cent, showing a considerable reduction of iron oxide from the slag, coming in turn from re-oxidized iron of the tuyere regiens. The re-oxidation of the iron is, therefore, a considerable item to be reckoned with and it is fairly certain that, in furnaces using cold-blast, this reaction is very great. The surprising results coming from the use of hot blast, as well as dry hot blast would be closely connected with a considerable diminution of this re-oxidation before the tuyeres.

Possible Improvements Indicated

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For the economic operation of blast furnaces, it would seem, therefore, that these developments point the way for future improvements. The increase in blast temperature with the use of dry air, and the application of industrial oxygen for the blast enrichment are among these. Much can also be done in the way of blast furnace design. Thus Doctor Wuest gives illustrations of the lower portions of three blast furnaces in which the hearth diameters are respectively 10, 15 and 20 ft. Taking the zone of re-oxidation as extending inward about three feet for every blast furnace, the proportion of re-oxidation area to the furnace crosssection in the three cases will be respectively 90, 68 and 55 per cent. Hence the wider the hearth in a given furnace, the better the results should be. An elaborate table of dimensions and yields of furnaces is given by Doctor Wuest, as furnished him by a number of producers, and these fully bear out the contention that, for similar temperature and capacity conditions, the furnaces with larger diameter hearths gave greater yields and used proportionally less fuel.

The fact that the yield of iron is far greater in the wide-hearth furnaces in proportion to blast increases applied, and similarly, to the proportion of coke used, shows that the improvement does not lie in simple structural and operating changes only, but that there is a distinct metallurgical advantage to be gained by the proportional reduction of the re-oxidation area to the furnace hearth cross-section. The advantages of a widened hearth of a furnace are, however, only fully realized if the blast volume is more than proportionally increased, for the re-oxidizing action with only a proportional blast increase is more marked in the first place. The furnace must, therefore, be forced by putting in more than the proportional blast increase. Examples of existing furnaces are given to prove this assertion

The contact of the slag containing the re-oxidized iron with incandescent coke and molten iron becomes an increasingly important factor as the hearth diameter increases, for, with wider hearths, the proportion of re-oxidation areas becomes smaller. Hence greater yields from that standpoint. It becomes a question, therefore, whether it is not possible to carry the imprevements in design still further so that even smaller proportional re-oxidation areas are achieved and so that the drops of molten iron in passing downward are proportionally less exposed to injurious influences, and in the main pass through a gas phase which is neutral. Hearthless blast furnaces would seem to offer much greater advantages than the usual present profile, and a furnace would be even better in which the crucible has a larger diameter than the shaft itself. Such furnaces have been built and were described heretofore (Stahl u. Eisen, 1887, page 163). The drops of iron in such furnaces would fall almost entirely clear of re-oxidizing influences, and give a far better product.

Factory labor turnover is being studied by the United States Bureau of Labor Statistics. Figures for December, from 175 manufacturing companies with about 800,000 employees, show an accession rate of 27.1 and a total separation rate of 30.6. The latter was divided into voluntary "quits," with a rate of 20, layoffs with a rate of 7.1, and discharges with a rate of 3.5.

LOWER CASTINGS ORDERS

Production in February Equaled January—Orders Better Than 1926 Average Month

Washington, March 22.—Bookings of commercial steel castings in February amounted to 91,229 net tons, or 69 per cent of the shop capacity, based on reports received by the Department of Commerce from 122 concerns having a present monthly capacity of 132,500 tons, representing more than 80 per cent of the commercial steel castings capacity of the United States. Of the output of the reporting producers 60,100 tons are usually devoted to railroad specialties and 72,400 tons to miscellaneous castings. The February orders compare with 101,367 tons, or 77 per cent of capacity, in January.

Bookings of railroad specialties in February totaled 39,792 tons, against 48,717 tons in January, representing 66 and 81 per cent of this class of capacity, respectively. Bookings of miscellaneous castings in February amounted to 50,437 tons, or 71 per cent of this kind of capacity, compared with 52,650 tons and 73 per cent in January.

Production in February aggregated 84,240 tons, against 84,275 tons in January, each being 64 per cent of capacity. Output of castings for railroad specialties in February totaled 33,250 tons, against 32,982 tons, each being 55 per cent of capacity. Production of miscellaneous castings for the respective periods totaled 50,990 tons and 51,293 tons, each 71 per cent of capacity.

While bookings fell 10 per cent from January, and were 4 per cent below February, 1926, they were more than 10 per cent ahead of the average month of 1926, despite the shortness of February. Production was 8½ per cent under February, 1926, and 7 per cent below the average month of last year. Production in 1926 totaled 100,000 tons higher than bookings. So far in 1927, however, orders have outstripped production by 24,000 tons.

Stedfast & Roulston, Inc., Take Over Hill, Clarke & Co.

Effective April 1, Stedfast & Roulston, Inc., will take over and operate the business of Hill, Clarke & Co., Inc., Boston, one of the oldest and best known machine tool houses in the country. The personnel of Stedfast & Roulston, Inc., consists of A. R. Stedfast, president; J. W. Roulston, vice-president; E. A. Nye, treasurer.

Both Mr. Stedfast and Mr. Roulston are well known in the machinery trade, particularly so in the New England territory, having been associated with Hill, Clarke & Co., Inc., for more than 40 years. Mr. Nyehas been associated with the Boston firm for 15 years, having charge of its financial department.

Stedfast & Roulston, Inc., will represent 15 manufacturers of tools, including presses, drilling machines, shapers, lathes, grinding and polishing machines, planers, precision lathes, pipe machines, milling machines, vertical boring mills, horizontal boring machines and turret lathes.

Its organization includes A. M. Stedfast, who will confine his activities to Massachusetts; C. V. Peterson, who will cover the Rhode Island and southern Massachusetts territory; J. E. Hall, the Connecticut territory; R. H. Anderson, Maine, New Hampshire and Vermont; while A. R. Stedfast and Mr. Roulston will handle Boston. The firm will be located at 156 Oliver Street, Boston. Hill, Clarke & Co., Inc., have been in this building for more than 40 years.

The Power Transmission Association, Drexel Building, Philadelphia, is offering a prize of \$250 for the best slogan emblem design for the association received by June 5, next. The American Society of Mechanical Engineers has been asked to name a committee of three judges. The award will be announced at the convention of the National Industrial Advertisers Association in Cleveland June 15.

What's Wrong with Steel Selling?

Horse-Trading Methods Still in Vogue, Says Charles F. Abbott, Director of American Institute of Steel Construction— "Get a Profit" He Advocates as One Remedy

H ORSE-TRADING methods are still being used in the selling of steel products, and this is one of the most important reasons for the lack of adequate profits in the steel industry, according to Charles F. Abbott, executive director American Institute of Steel Construction, in an address to the Concrete Reinforcing Steel Institute on Monday, March 21, at a convention at White Sulphur Springs, W. Va.

Although several divisions of the steel industry have recently taken steps, Mr. Abbott said, to correct some of the abuses of steel selling, other abuses remain, and these he enumerated as follows:

No Organized Research Work

"First: There has been a lack of research. The steel industry has done practically nothing, in an organized way, to develop new uses for steel. Most of the important new uses for the commodity were initiated by the users. The automotive industry, for example, came to the steel industry and specified its requirements. And so did the manufacturers of steel railroad coaches.

"Second: Opportunities have not been followed up. Even when a new use was discovered, little was done to develop it. In other lines of business, as soon as a new way of using a material is found, advertising is immediately employed to tell the world about it. For example, the Bakelite Corporation not only advertises to the many markets using its material, but it also uses advertising to scout for unknown uses.

Too Much Inside Competition

"Third: There is the matter of too much inside competition. As distributers, we have been competing with ourselves and thus letting our real competitor, the manufacturer of substitute materials, make unwarranted headway. Further, the steel producer has not always adhered to policies best calculated to enable steel to meet such competition from substitute products.

"I feel somewhat embarrassed in discussing this question before the Concrete Reinforcing Steel Institute as I have but recently been advised of a condition that is drawing a great deal of comment, much to the discomfiture of the structural steel industry.

"My attention has been called to an address by O. H. Cheney, vice-president American Exchange Irving Trust Co., New York. The address was delivered in Chicago before the Business Secretaries' Forum on Feb. 16. In the course of his remarks the speaker pointed to the fact that the United States Steel Corporation is contributing a large sum to the fund of the Portland Cement Association. It is, of course, well known that this fund is being used to promote a greater use of reinforced concrete, the principal competitor of structural steel. There is no question that one of the outstanding effects of the Steel Corporation's contribution is the displacement of a large tonnage of steel. It is rather unfortunate, though not without its amusing aspects, that such a policy should be so freely commented upon by architects, engineers, and others interested in construction.

Structural Steel Being Displaced

"Naturally, the structural steel industry is placed in a difficult position when the greatest producer of steel is featured as appropriating a large sum to promote the interests of the chief competitor of the steel fabricator. This is all the more the case since no money whatever is being contributed by this producer to further the interests of the industry now producing annually 2,700,000 tons of fabricated steel.

"As a result of this action, reinforced concrete bene-

fits at the expense of steel. Its consumption is being extended, while structural steel is being displaced and its market circumscribed. There is, however, no comment that should come from me, as those who have assumed responsibility for this contribution undoubtedly feel justified in what they have done.

"Topsy-Turvy" Trade Relations Exist

"Fourth: There is the abuse that can best be described as topsy-turvy trade relations. Producers have been foolishly competing with the intermediate or distributing industries—their best customers—by going direct to the consumer and, in many instances, underselling the distributer.

"Legitimate distributing factors in the steel industry have not received the protection that is given in practically every other line of business. For instance, so-called desk brokers, with no capital invested in plant or equipment, have been given the same, or more favorable, recognition that is accorded the established distributers with heavy investments in their properties.

"Equitable methods of sales and distribution must

"Equitable methods of sales and distribution must be adopted and adhered to, otherwise the distributers cannot be expected to function efficiently. Dissatisfaction and suspicion quickly breed destructive forms of competition. The distributing system becomes disorganized. The producer is then left with no alternative but to go direct to the consumer for the major part of his business. This is an expensive procedure, an unsatisfactory plan, and in the end a totally ineffective policy.

Closer Cooperation Needed

"Efficiency demands a cooperative relationship between the producer and the distributer. They have a common interest, and, unless their problems are considered jointly, unless they are worked out through mutual understandings, these problems inevitably accumulate with all their attendant difficulties.

"Distributers, of course, have their responsibilities to the producer, since he relies upon them for the proper distribution of his products. Distributers must be efficient, apply modern methods, and give the producer the sales volume he has a right to expect.

"Failure on the part of the distributers to function properly would naturally invite the producer to disregard their interests and go direct to the consumer, or adopt any other policies essential to maintain the volume of business required to enable the producer to operate his plant on a profitable basis. Distributers cannot, and should not, overlook their own responsibilities, or fail to maintain high standards of selling efficiency.

Horse-Trading Selling Methods

"Finally: We have with us, as the fifth and perhaps the most prevalent of all abuses, our horse-trading methods of selling. This situation is due primarily to a lack of a price policy. Steel has always been sold for what it will fetch, rather than for what it is worth or what it cost to produce.

"It is to this fifth condition that I am going to devote myself largely, for horse-trading methods of sales-manship are rampant, throughout the industry.

"I do not say this in criticism of the business. Horse-trading methods have prevailed in nearly all industries at some time. But the practice was long ago eliminated in most lines. The steel business has been slow in bringing itself up to the standards of other industries—not because it didn't want to, but due to the lack of cooperation among steel interests it has seemed impossible to formulate any plan that would

place the selling of steel on a better basis. The fact that the steel industry has now reached an era of co-operative endeavor will undoubtedly cure this abuse

"The first thing that we in the steel business must learn is how to arrive at a sales price. The formula is simple. A sales price is nothing more than the total cost of the product, plus a legitimate profit.

"No doubt this method of pricing is recognized by everyone in the steel business, but in the process of making a sale it is too frequently ignored. If a plant needs business, and if it is thought that a competitor is making a lower price, the cost of production is forgotten, the need for making a profit is swept aside, and a bid is put in that is supposed to be low enough to get the order. That the order may cost the company getting it, thousands of dollars, is not regarded as so important as the fact that all competition was beaten.

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Absence of One-Price System Costly

"The steel industry cannot get away from the selling methods of the trader until it establishes the one-price system of doing business. The absence of such a policy is costing the steel industry millions of dollars The practice of making bids that are below the cost of production is bad enough. Infinitely worse, however, is the custom of cutting the first price submitted and following with other revisions that make the price lower still. This is happening every day. "For instance, I know of a case where a prosperous

contractor in a large city summoned to his office the

reason that they are just as well off as their competitors, and, anyway, it is up to them to meet the other fellow's price, cost accounting or no cost accounting. They will tell you that they must get the business, profit or no profit, and they proceed to establish their prices on a basis of trying to outguess what their competitors may quote.

"This is a short-sighted argument to say the least. There is a vital relation between total cost and the selling price which cannot be worked out without cost accounting. Only as this relation is understood and put into practice can the establishment of a sales price that will insure a profit be realized. The general practice of disregarding cost is directed at getting the business away from a competitor and it fulfills no other function.

First Price Should Be Last Price

"The greatest confidence is inspired when the buyer can feel assured that the seller's first price is his last price. Likewise buyers have the greater faith in the industry that is fair in its prices but firm in its policy. They quickly mistrust those that permit more than one price, or make concessions beyond the prevailing cus-

"The National Association of Purchasing Agents has condemned any dishonest procedure in buying and especially the practice of unfairly forcing one seller against another to obtain cut prices. The Associated General Contractors of America has disapproved the practice of more than one price as they realize the

Diagnosis of the Ills of the Steel Business and the Remedies

IN an address delivered before the Concrete Reinforcing Steel Institute Charles F. Abbott, executive director American Institute of Steel Construction, diagnoses the ailments of the steel industry as: A lack of research, a failure to advertise properly, a failure to cooperate, topsy-turvy trade relations, horse-trading methods of salesmanship. The remedies he prescribes are: To establish the one-price system of selling. making the first price the last price; knowing costs and adhering to prices that mean cost plus a fair profit; a better type of salesmanship that stresses the economic importance of steel rather than price, and intelligent advertising.

lowest of ten bidders on a certain job. 'Tom,' opened the contractor, 'you and I have been friends for many years. For this reason I want you to get the order which I am about to place. The other bidders are strangers to me. But unfortunately several of them are lower than you. Sharpen your pencil and see if you cannot get your price down within reason.

"Tom expressed deep appreciation for the opportunity, finally dropping his price \$10 a ton, and went away with an 800-ton order, congratulating himself the while on what a wonderful salesman he was. Fortunately for his vanity, he never learned that he gave away \$8,000 to a smart buyer who, after all, was the better salesman. Tom would have got the order without making the cut, as he was already the low man.

"If that were an exceptional instance, it would not be worth mentioning, but unfortunately that sort of selling is altogether too common in the steel industry.

Sound Business Demands a Profit

"The establishment of a price is a complex matter which follows a law that must be obeyed. Unless men know how to add up total cost, and unless they add to this a sufficient profit, business cannot go on. The to this a sufficient profit, business cannot go on. The whole structure of trade is based upon profit, and not

upon the exchange of goods.

To sell at cost or less than cost is not business. It is bankruptcy. Nothing is business that does not make a profit.

Constant cutting of prices once submitted deliberately educates the public to regard cheapness as the inducement.

"Total cost plus profit equals the sales price is the only legitimate formula. Total cost minus profit, or practice shots plus guessing, leads directly to the door of the auctioneer.

There are far too many men in business who see little, if any, practical value in cost accounting. They wisdom of adhering to the one price policy.

"Advertising has helped manufacturers in most lines to put over the one price policy. As soon as a product is advertised and begins to stand for something in the minds of the buying public, the article in question is taken out of the price competitive class. To be sure, it still has to contend with competition, but not on the same basis as it did before. The unadvertised article is on a level with all competing products. There is not much to distinguish one from another except price.

"You might come back at me with this remark: 'A steel order is usually sought through a sealed bid. Each company making a bid is asked to supply a standard product to fit certain detailed specifications. All that is asked for is a price. Each bidder is supposed to be bidding on the same product as every other bidder. What chance is there for selling under such a situa-

Price Too Often the Controlling Factor

"If it is true that buyers have been deliberately educated to consider price as the only controlling factor, we must now devote our energies to undermining what has been accomplished, and to emphasizing the other considerations that should be of even greater impor-tance to the buyer who wishes to be guided by all the factors that influence investment value and economy.

'Steel salesmen should use their imaginations to picture the service that their product is going to render when it is in use. Take a bridge, for instance. I do not imagine that I am disclosing a secret when I say that most of our great bridges are sold at near cost or at a loss. Let us consider, for a moment, the Bear Mountain bridge, or the mighty steel span connecting Philadelphia and Camden. The economic impor-tance of these bridges is incalculable. These structures will serve millions of persons; yet the companies which

supply the material that make bridges of this type possible, although they assume great risks, make very little, if any, profit. Can you think of any greater absurdity?

Users of Steel Stress Its Value

"Manufacturers outside of the steel industry, who use steel in making their products, are not so backward in stressing the advantages of steel. There are at least 50 national advertisers today who are featuring steel in their copy. As I was preparing this address, I picked up a copy of the Saturday Evening Post, issue of March 5. The very first advertisement that I saw in that issue was that of a bolt and nut manufacturer whose page is headed 'A Miracle of Steel.' This manufacturer bases his whole selling appeal on steel.

"If those outside of our industry find it to their advantage to capitalize the qualities of steel, how much more should it be to our advantage to emphasize all the qualities of our own product?

Cost Plus Profit Should Govern Sales

"Of course it is not possible for any industry to use the kind of selling I have been advocating and to practice the one price policy unless it is solidly united. By this I do not mean that the industry should unite to control or to fix prices. This is illegal and cannot be done. There is no reason, however, why an industry cannot get together to formulate a cost accounting system and to agree to base its prices on the formula of cost plus profit.

"There is also no reason why any industry cannot agree to respect the rights of all legitimate factors in the industry. Distributers should be protected. Producers should stop competing with and undermining their own distributers. In a word, an industry cannot get itself onto a profitable basis until it is fair, not only with its competitors, but with all the factors in

the trade.

"An industry cannot be profitable until producers and distributers unite in constructive cooperation to meet all problems confronting the industry. Take the problem of foreign steel. This is a question that the steel industry of this country must solve.

The Import Steel Situation

"During 1925 there were imported approximately 66,000 tons of steel bars and 86,000 tons of structural steel shapes and building forms. During 1926 imports were approximately 117,000 tons of steel bars and 136,000 tons of structural steel shapes and building forms. The increase shown is a considerable one, although the quantity may not yet be sufficient to cause any concern on the part of the American producers. Apparently that is why they seem indifferent to the problem.

"I had the pleasure of attending a recent conference where the question of foreign reinforcing steel was up for consideration. It seems that a few jobbers were offering for sale foreign material at considerably lower prices than market quotations on domestic material, while the majority were anxious to confine all sales to American made steel.

"The principal difficulty was with the few who cared little for sentiment or who attached any importance to the question of quality. Their interest was confined to immediate sales and profits.

"Lower prices offered an attractive inducement and sales were increasing, while those loyal to the superior quality of the American product were suffering a loss of business that they admitted they could not afford.

"Appeals had been made to the American producers without any assurances that they could relieve the situation or offer any suggestions that might encourage a policy to remain firm and feature American made steel.

"The following suggestion was submitted as offering a possible solution:

Place all sales emphasis on American-made steel, not because of sentimental reasons, but because of a more dependable uniform quality and service. The future of the industry could best be insured by eliminating all elements of chance.

Put in stock a limited supply of foreign material to be used as a medium to force sales of American steel.

If, after exerting every effort to sell the domestic product, utilizing every selling inducement, the customer still was influenced by the lower price, then accept the order and thereby prevent a loss of business.

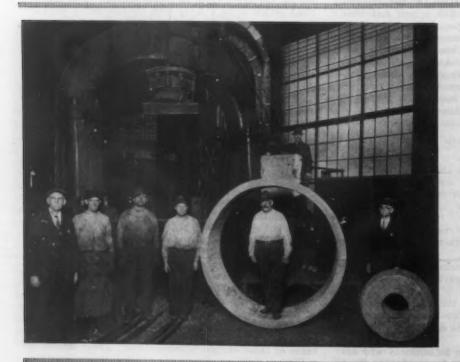
Would Tend to Restrict Foreign Competition

"This plan would, however, result in the customer purchasing the domestic steel in most cases. It would afford the means by which fire could be fought with fire, instead of standing pat on American steel with no comeback with which to reinforce the position.

"This is a logical, practical plan by which competition with foreign steel can be overcome without losing business in pursuing a too conservative policy.

"Perhaps I have been doing a lot of prescribing in this address. Well, I have not been prescribing anything that the division of the steel industry with which I am associated is not willing to follow. We are taking the medicine which I have been prescribing for others.

The American Institute of Steel Construction believes enough in steel to want to tell the world about it. Through advertising we hope to invest structural steel with qualities in the minds of buyers that will lift it out of the competitive class to which it has long been subject. We realize that the advertised business is today the only business that can get away from undesirable competitive selling."



THE accompanying illustration shows the largest retaining ring which has ever been forged in the Schenectady plant of the General Electric Co. The ring weighs 4½ tons and is to be used in a 60,000-kw. turbine-generator now under construction at the Schenectady plant. The ring was forged from a solid billet of nickel steel 32 in. in diameter and 42 in. long. A small hole was pierced by a 6-ton forging hammer to 11 in. in diameter and by successive heating and forging under a 3-ton hammer the ring was enlarged to the size shown. The outside diameter of the completed ring is 79 in. and the inside diameter is 69 in. The face measures 27 in. across

SCRAP DEALERS MEET

National Association Holds Annual Meeting-May Hold Convention in Chicago

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THE fourteenth annual convention and banquet of the National Association of Waste Material Dealers was held March 16 at the Hotel Astor, New York. In his annual report President Egmont L. Frankel, of Frankel Brothers, Ltd., Toronto, said: "Last year at this time I voiced the hope that when next we met we could look back upon a year that had at least brought us some of the fruits for which we labored." Although this hope had not been realized, President Frankel pointed out that the stability of the association had not been shaken, its effectiveness had not been impaired and its prestige was unaffected.

He spoke particularly of the foreign trade division of the association and its work, with special reference to the decision of the association to purchase foreign material only on the basis of 90 per cent letter of credit. "I am told," he said, "that much unfavorable comment has been made by European shippers, who consider this action as an extremely arbitrary one, fundamentally unfair and unjust. I consider it perfectly sound and ethical. By this action we say to the European shipper, 'We trust you to the extent of 90 per cent and ask you to trust us to the extent of 10 per cent.'"

At the meeting of the scrap metal division of the association, under the chairmanship of George Birkenstein, S. Birkenstein & Sons, Chicago, there was a discussion of the classification of scrap metals. meeting concluded that it would be advisable to have new classification committee appointed to go over the entire classification and make revisions in line with current conditions.

The following officers were elected for the coming year: G. H. Rady, E. J. Keller Co., New York, president; Henry Lissberger, Federated Metals Corporation, New York, first vice-president; James Rosenberg, New York, the association counsel, and its representative in the Chamber of Commerce of the United States, second vice-president; Henry Levitt, Michigan Smelting & Refining Co., Detroit, third vice-president. Charles M. Haskins continues as secretary.

At the meeting in the morning it was suggested by Benjamin Friedman, Metals Refining Co., Hammond, Ind., who is chairman of the western division of the association, that an annual meeting should be held in the West. While it was believed that the fifteenth convention of the association, next year, should be in New York, the meeting of the following year may be scheduled for Chicago. A special meeting of the Western members is in preparation for next fall. The annual banquet of the association was attended by more than 500 members and their guests.

Worcester Metal Trades Choose Officers for the New Year

Worcester Branch, National Metal Trades Association, held its annual meeting at Worcester, Mass., March 18, and reelected A. Sherman Miller of the Eastern Bridge & Structural Co. as president. Other officers chosen were: Vice-president, John C. Spence, Norton Co.; secretary, Donald Tulloch; treasurer, William Arter, Arter Grinding Machine Co.. Elected members of the executive board are Roger N. Heald, Heald Machine Co.; Philip M. Morgan, Morgan Construction Co.; Albert C. Marble, Curtis & Marble Machine Co.; Henry H. Wright, M. S. Wright Co.; Machine Co.; Henry H. Wright, M. S. Wright Co.; Joseph R. Rogers, Rogers Drop Forge Co.; Fred S. Morton, Matthews Mfg. Co.; Frederick W. McIntyre, Reed-Prentice Co. (all of Worcester); W. W. Shuttlesworth, Warren Steam Pump Co., Warren, Mass.; Elliott J. McKnight, L. G. McKnight Co., Gardner, Mass.; Charles A. Clarke, Universal Boring Machine Co., Hudson, Mass.; Frank A. Ball, L. S. Starrett Co., Athol, Mass., and Richard Fosdick, Fitchburg Steam Engine Co., Fitchburg, Mass. The board also includes as past presidents, John W. Higgins, Worcester Pressed as past presidents, John W. Higgins, Worcester Pressed Steel Co.; Jerome R. George, Morgan Construction Co., and Albert J. Gifford, Leland-Gifford Co. Action was taken on the deaths in the year of William H.

Gates of the Baldwin Chain & Mfg. Co., a past president, and Prof. George I. Alden of the Norton Co., honorary president of the branch.

The annual dinner of Worcester Branch will be held at Hotel Bancroft on the night of March 25. The speaker will be Sir Esme William Howard, British ambassador to the United States.

Coming Meetings of Mechanical Engineers

Among meetings scheduled by the sections of the American Society of Mechanical Engineers may be mentioned the following:

Birmingham, April 19: Alabama Power Bullding, at 7.45 p. m. Subject: The Oil Electric Railway Locomotive. Speaker: W. L. Garrison, Ingersoll-Rand Co., New York. Detroit, April 13: Detroit Engineering Society Clubhouse, at 8 p. m. Subject: The Patent Situation. Speaker: Hon. Thomas Robertson, United States Commission of Patents, Washington.

Detroit, March 30: Detroit Engineering Society Clubhouse, at 8 p. m. Subject: Industrial Power Plants. Speaker: Charles S. Gladden, director power and construction section, General Motors Corporation.

Newark, N. J., March 28: Meeting at 842 Broad Street, 8 p. m. Joint meeting with machine shop practice division. bject: Plant Maintenance. Speaker: G. H. Ashman,

General Electric Co.

West Virginia, March 30: Charleston, W. Va., Ruffner
Hotel, 6 p. m. Subject: Industrial Education. Speaker:
John T. Faig, president Ohio Mechanics Institute, Cincinnati, and chairman of committee on education and training for the industries.

Worcester, March 29: Sherer's Restaurant, 6.30 p. m. Subject: Machine Design as Influenced by Foundry Practice. Speaker: E. H. Ballard, General Electric Co.

To Discuss Metallurgy of Aircraft Engines

The first national meeting of the aeronautic division of the American Society of Mechanical Engineers which will be held at Buffalo, April 25 and 26 will provide for the inspection of the main plant of the Curtiss Aeroplane & Motor Co., the Consolidated Aircraft Corporation plant, and the Buffalo Municipal Airport. The headquarters of the meeting will be at the Hotel Statler.

The first technical paper will be "Transport Airplanes" by Anthony H. C. Fokker, internationally known airplane designer. This will be followed by a paper on "Metallurgy of Aircraft Engines" by Bishop Clements of the Curtiss Aeroplane & Motor Co.

Drop Forgers' Convention at French Lick, Ind.

The American Drop Forging Institute holds its annual convention at the French Lick Springs Hotel, French Lick, Ind., May 17, 18 and 19. C. president Steel Improvement & Forge Co., C. H. Smith, Cleveland, chairman of the convention committee, will soon an-

officers of the convention committee, will soon announce the program of the convention.

Officers of the institute are: C. W. Wright, vice-president of the Steel Car Forge Co., Pittsburgh, president; A. D. Armitage, chairman J. H. Williams & Co., Buffalo, first vice-president; J. P. Hopkins, vice-president Atlas Drop Forge Co., Lansing, Mich, second vice-president, and Donald McKaig, 1001 Union Bank Building, Pittsburgh, secretary.

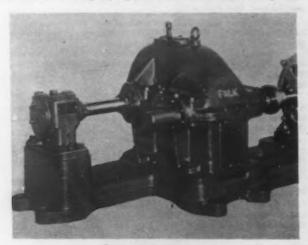
Machine Tool Dealers to Meet at Granville, Ohio

The May meeting of the Associated Machine Tool Dealers will be held May 25, 26 and 27 at Granville, Ohio. The association will be addressed by J. A. Smith, general superintendent Schenectady works, General Electric Co., and by Mason Britton, vice-president McGraw-Hill Co. J. R. Vandyck, Vandyck Churchill Co., New York, is president, and Tyler W. Carlisle, Strong, Carlisle & Hammond Co., Cleveland, is secretary.

Speed Reducers with Continuous-Tooth Herringbone Gears

A new line of speed reduction units featuring continuous-tooth steel herringbone gears has been brought out by the Falk Corporation, Milwaukee. The reducers are made in three types—single reduction, for ratios up to 9:1; double reduction for ratios up to 70:1; and triple reduction for ratios up to 300:1. One of the double-reduction units, designated as the No. 7-D, is shown in the illustration.

In the housing design, internal ribs, projections and complicated cores have been eliminated, which is stressed as simplifying lubrication in that the possi-



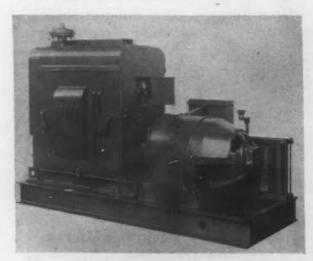
The Type of Gear Employed, the Bearing Design and the Lubricating System Are Features

bility of dirt or core sand working into the gears is definitely removed. Added features are the airplane type, steel-backed, babbitt-lined bearings designed for carrying heavier loads, and an improved automatic continuous lubrication system.

The line covers a certain number of standard reduction ratios, and standard motor beds have been adopted for the units. Standardization of the units and the beds in accordance with general industrial demands is stressed as permitting stock delivery of these reduction units.

Small Gas Engine Driven Welding Set

A small engine driven welding outfit adapted for oil field and shop work or for any application where power supply is not available for driving a motor gen-



Welding Set for Use Where Power Supply for Driving Motor Generator Is Not Available

erator type of welder has been added to the line of welding equipment offered by the General Electric Co., Schenectady.

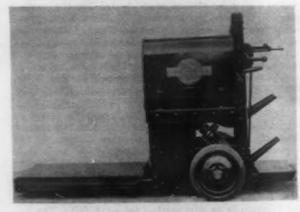
The set incorporates the company's WD-11 welding generator with a continuous rating of 150 amp. and a 1-hr. rating of 200 amp., the current range running from 50 to 250 amp. The generator is driven by a Continental P-20 power unit capable of developing 23.5 hp. at 1400 r.p.m. The generator is equipped with a control panel, rheostat and self-adjusting stabilizing reactor. The engine accessories include a radiator, pressure feed lubricating system with oil pressure gage and indicator, vertical tube gravity feed carbureter, air cleaner, centrifugal governor, starting crank, 10-gal. gasoline tank, tool box and sheet metal hood with sheet metal side panels which can be locked in place. The set is mounted on a structural steel base as shown in the illustration.

Develops Small Electric Truck

Compactness, adapting it for use in congested plants, is a feature of a new electric truck named the Crescent Star, which is being placed on the market by the Crescent Truck Co., Lebanon, Pa. Lower initial cost as compared to larger trucks, and economy of operation, are also stressed by the manufacturer of the machine.

The truck has been developed primarily for use with the 7-in. hand-lift truck skids and has a capacity of approximately 2500 lb. The width is 30 in., overall, the length 82 in., overall, and the weight, with nine-plate battery, approximately 1525 lb. Because of its narrow width, the machine may be operated through a 32-in. doorway, and due to its compactness and light weight, the truck can be used on elevators which are too small for the heavier type machines.

The speed of the machine, light, is 6 miles per hour, and loaded, 4 to 5 miles per hour. The turning radius is 7 ft. 6 in. The lifting mechanism is actuated by a foot pedal, and by means of this mechanism, for which patent has been applied, it is claimed that an



The Machine May Be Run Through a 32-In. Doorway and Placed Conveniently on Elevators

operator weighing 135 lb. can lift a load of approximately 3500 lb. The machine is driven by a 24-volt General Electric motor through a straight worm and worm wheel reduction. The driving tires are 3½ x 15 in. and are of the pressed-on automotive type. The trailing tires are of steel and are 3 x 6 in. in size.

Improved Compressor Unloading Device

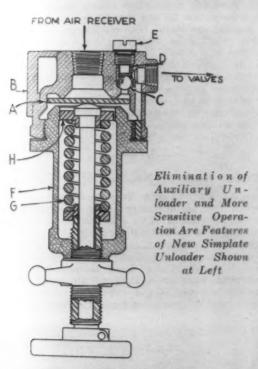
An improved Simplate differential unloader for its air compressors has been announced by Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York.

Advantages claimed for the new device include the elimination of auxiliary unloader, thereby simplifying unloader piping; more sensitive operation due to absence of close fits; wider application of pressure ranges; ease of installation, cleaning and servicing; and relative low cost of repair. This unloader is built for standard pressures from 50 to 125 lb.; for low pressure work of 40 lb. or less; and for high pressure work up to 500 lb.

The arrangement of the new unloader may be noted from the accompanying illustration. The valve A is a single plate of stainless steel, ground to a flat surface. The diameter is also ground to fit cap B with a few thousandths clearance, and the edge is rounded to prevent sticking. The cap B contains the ball check valve

C, spring D and ball check screw E. The flanges by which the unloader is attached to the compressor or panel are on the cap, which permits dismantling the unloader without disturbing the piping or valves. The device operates with a 5-lb. range between unloading and loading the compressor.

As the air pressure rises to 100 lb, the pressure on the upper side of the valve A balances that of the spring on the under side, and air escapes past the seat into the annular space around the outer edge of the disk. It is stated that because of the close fit of the disk in the cap B and the ball check valve the air can



not escape and a slight pressure is built up, which, acting upon the surface of the disk, balances the pressure of the spring on the lower side of the disk, and the disk moves down against the seat in the body of F. The ball check valve is then exposed to full receiver pressure and, being held on its seat by a light spring, immediately moves off the seat and uncovers a ¼ in hole for air to pass through on its way to the unloading inlet valves.

Upon a drop of receiver pressure equal to the range, in this case, 5 lb., the pressure of the spring G balances the pressure due to the air on the disk and permits leakage past the lower seat into the space around the stem. This leakage is restricted slightly by the upper spring holder H, which is a moderately close fit in the body F, and a slight overbalancing pressure is built up which causes the valve disk A to return to the upper seat, air being vented from the unloading piping past the upper spring holder.

Employment Gains in Metal-Working Shops

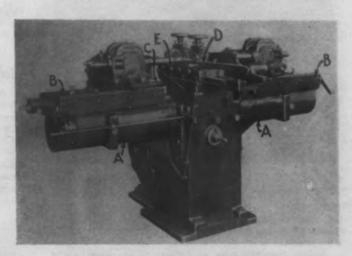
The number employed in shops affiliated with the National Metal Trades Association in February totaled 615,179, an increase of 16,526, or 2.7 per cent, over the total for January. The largest gain reported from any city was from Detroit, where 223,409 employees were at work in association shops in February, or 8676 more than in January and 19,513 more than in December. Shops in New England, New York, New Jersey, Pennsylvania and Maryland showed virtually the same number of employees for February as for the preceding month, the gain having been exceedingly small. For Ohio, Indiana and Michigan, however, there was a marked increase. Further west reports were less favorable. Milwaukee reported a slight gain, but losses were recorded for Chicago, Peoria, Ill., Moline, Ill., Rock Island, Ill., Davenport, Iowa, and St. Louis. The grand total of 615,179 for February falls considerably short of the figure for the same month in 1926, which was 652,844.

Special Machine for Drilling Wrist Pin Holes

A horizontal duplex machine, designated as the No. 19, equipped with four standard heads and jig for drilling wrist pin holes in pistons, has been built by the Moline Tool Co., Moline, Ill.

The machine consists of a pedestal to which two side members A A are bolted, forming a long bed. Through the center of the bed is mounted a large shaft which carries two drum cams formed to give the desired traverse to the slides B B mounted on the ways of the bed. The slides are arranged to carry standard single spiral heads, the spindles of which are laterally adjustable to compensate for wear of drills.

Power is supplied by a 7½-hp., 1200-r.p.m. motor, which is mounted on the base and belted to the drive shaft, C. From the main drive shaft, C, the power is transmitted to the spindles through spiral gearing. The feed is derived from the main drive shaft and is



Two Pistons Are Drilled While Two Are Being Loaded.
The drilling cycle is automatic

transmitted through gearing and cams. The two slides feed in simultaneously and the cams are designed to give a complete cycle of operations, consisting of the quick approach of the drills, slow feed and quick return of the drills. Rollers which are mounted on the slides run in the grooves of the cams, and that part of the cam which does the heaviest work is made of hardened steel. The two slides are independently adjustable.

The jig, designed to carry four pistons, is mounted on a sliding plate, which is actuated by lever D. Two pistons are drilled simultaneously, while two others are being loaded. When the spindles return to the starting position the jig is indexed over to the other position and the cycle is repeated. The time of a complete cycle is said to be 45 sec. The machine can be set to repeat the cycle without stopping, or it can be set to stop automatically at the end of each cycle. The pistons are centered in the jig by means of a cam clamp operated by knob E, and are clamped by the handwheel, above, two pistons being clamped in the jig by each handwheel. The floor space required for the machine is 4 ft. 8 in. x 8 ft. 8 in. The shipping weight is approximately 5000 lb.

In engineering, a man's success is due approximately 15 per cent to technical knowledge of his particular field and 85 per cent to those human qualities which have to do with successful dealing with people, according to Prof. N. L. Hoopingarner, professor of business psychology, School of Commerce, New York University. A man's worth above \$30 or \$40 a week, he says, is dependent on his ability to get favorable results from people. He has subdivided ability into the following traits: impressiveness, initiative, thoroughness, observation, concentration, constructive imagination, decision, adaptability, leadership, organizing ability, expression and knowledge.

Air-Driven Portable Hand-Saw Available in Three Sizes

A portable hand-saw, operated by compressed air and claimed to permit of marked savings as compared to hand sawing methods, has been brought out by the Ingersoll-Rand Co., 11 Broadway, New York,

Ingersoll-Rand Co., 11 Broadway, New York.

Three sizes of the machine, employing 6-, 8- and 12-in. blades, respectively, are available. By changing saw blades, the machine may be employed for sawing a variety of materials including wood, soapstone, Bakelite, wallboard, electric cable, and various forms of copper. Cross-cut or rip blades for different types of work are available. The tool may be used for cutting timber, for trimming work on buildings and scaffold-



Operation of the Safety Saw Guard Is Automatic. The drive is by means of a three-cylinder air motor

ing, for railroad car repair work, and in shipping rooms of manufacturing plants. The weight of the 8-in. machine is 23 lb.

Safety features were an important consideration in the design of the machine. The design combines the company's three-cylinder type of air motor, used in the company's portable grinders and light-weight drills, with the Crowe safety saw guard. The safety guard is of a telescopic type. It opens when the saw is applied to the material; and it closes automatically and locks in position as the cut is completed. The saw guard has an adjustable stop so that the saw can be set for the required depth of the cut. The three-cylinder air motor is of the balanced type, and is said to be smooth running, and free from breakdowns. All wearing parts, including the cylinders, are renewable.

New Shipping Container

A shipping container for paints, leads, greases, food and other products, and stressed as having a number of advantages for shippers, is being offered by the Geuder, Paeschke & Frey Co., Milwaukee.



Design of the Top and Method of Sealing Are Features. The top, be in g slightly reduced in size, protects the gasket joint and facilitates stacking

The general construction of this container, known as the Wedg-Seal, is shown in the illustration. The sides have a slight inward slope beginning a short distance below the top. Since the top does not protrude beyond the sides, any blow or shock is taken by the body of the pail, and is not transmitted to the cover. An important advantage is that the containers

can be stacked directly on top of one another, with the sides of adjacent columns touching. Staggering or offsetting to secure a steady stack is thus unnecessary. It is pointed out that from the shipper's standpoint a direct saving is made by the greater number of these containers that can be shipped per car, and that the time and labor required for chocking and blocking to assure a non-shifting load is saved.

This pail gets its name, Wedg-Seal container, from the design of the top and the method of sealing. The top is put on and sealed in place by a special device, which is regularly furnished by the company. A machine-cut one-piece composition rubber gasket is compressed between the lid and the upper rim of the can by the sealing operation. The method of clamping is

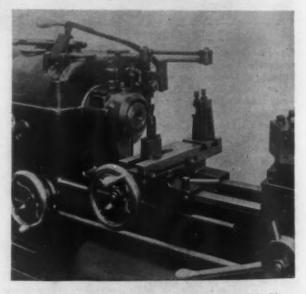
claimed to hold the lid solidly in place, and the design is such that any outside blow tends to seat the cover tighter. It is stated that the contents of the container are sealed air-tight and arrive at destination in the same condition as when shipped.

For food products, lacquer, enamels, etc., the containers can also be furnished with hot-tinned or hot galvanized interior coating. Standard sizes from 2½ to 6 gal., inclusive, are available.

Improves Line of No. 4 Turret Lathes

A new No. 4 turret lathe, incorporating several improvements, has been announced by the Warner & Swasey Co., Cleveland. This machine has a bar capacity of 1½ x 10 in. and for chucking work, an 8-in. swing capacity.

The new No. 4 machines may be furnished with a six-speed all-geared type of head, as well as with a six-speed cone head or a 12-speed all-geared head. Another new feature is the power-feed cross slide, with which any of these machines can now be fur-



In Addition to the Plain Screw-Feed Cross Slide Shown Above, a New Power-Feed Cross Slide Is Available for the No. 4 Turret Lathes

nished, as well as with the plain screw-feed cross slide formerly available. In the power-feed cross slide, six power cross feeds are provided. These six feeds are obtained by levers, mounted on the carriage apron within convenient reach of the operator. Longitudinal feed is by means of a hand wheel, mounted on the front of the machine, near the head end. A round tool post is provided on the front of the power-feed cross slide carriage and a holder, for a cutting off tool is used on the rear of the carriage.

The plain screw-feed cross slide is of the handoperated type, with both the cross feed and longitudinal feed operated by separate hand wheels. The
hand wheel for the longitudinal feed is mounted at
the front end of the turret lathe near the head end,
and the wheel for the cross feed is at the front end
of the screw-feed carriage. The tool post equipment
is the same as that furnished on the power-feed cross
slide.

New Nibbling Machines

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Two new sizes, designated as the Nos. 0 and 2-B, respectively, have been added to the line of nibbling machines manufactured by Andrew C. Campbell, Inc., Bridgeport, Conn.

The No. 0 machine is of bench-type and is intended primarily for cutting thin stock up to No. 14 gage, or 3/82 in. It may be used for trimming embossed work, duplicating small parts, template making, small stencil or sign cutting, etc. The principle of operation, the punch and die, is the same as in the larger machines

or a round spray, by a simple adjustment. It is stated that the atomization is fine and even that "orange-peel" is eliminated, minimizing sanding and rubbing. The spray can be so closely adjusted that it can be used for touching up, shading and high lighting. An air pocket, formed by the fan-shaped nozzle, completely surrounds the atomized spray, reducing the loss of material through evaporation. When dusting is desired, a trip lever is raised, which shuts off the paint and permits the air to function. Both the air and paint valves are operated simultaneously. By pulling the trigger, paint flows to the atomizing chamber,



The Bench Type
Nibbling Machine, at Right,
Is Adapted for
Making Templates, Etc., from
Stock Up to 3/32
In. The larger
machine, at the
left, is for
chrome - nickel
steel sheets up
to 3/8 in. thick



described previously in THE IRON AGE. The cutting speed is 60 in. per min.

Power is supplied by a direct-connected ¼-hp. motor mounted on a bracket at the rear of the machine as shown in the illustration. The machine can be furnished with legs if desired. The punch diameter is 3/16 in. and the depth of throat is 8 in. The bench space occupied is 8½ by 24 in. and the height is 16 in.

The weight is 124 lb. net.

The No. 2-B nibbler is built to order only. It is designed for cutting large sheets of chrome-nickel steel up to % in. in thickness and is adapted for the making of cams, stripper plates, templates and similar work. The deep throat, 30 in., makes possible the cutting of much larger sheets than with the standard No. 2 machine. At 350 strokes per min., the machine is said to cut the %-in. stock at the rate of approximately 26 linear in. per min. Belt drive is furnished unless motor equipment is ordered. The floor space occupied is 3 ft. 5 in. by 4 ft. 7 in. and the height of the machine is 5 ft. The net weight, with belt drive,

Triple-Purpose Paint Spray Gun

A triple-purpose spray gun, arranged for use as a siphon-feed, pressure-feed, or gravity-feed sprayer, has been placed on the market by the Alexander Mil-

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The Gun Arranged for Use as a Siphon-Feed, Pressure-Feed or Gravity-Feed Sprayer. It is adapted for both fine and coarse work

burn Co., Baltimore. It is designated as the 3-in-1, and is intended for very fine work, such as painting and lacquering automobiles, furniture, etc., as well as for coarse operations, such as painting machinery or freight cars.

The multiple-head adjustment permits either a flat, fan spray in either horizontal or vertical position,

is expanded and driven into the pores of the surface to be covered.

Features of the gun include an adjustable, self-centering fluid pin. which, by a mere turn, increases or decreases the volume of paint. The head is conveniently adjustable for flat spray in any direction, also a round spray, without loosening a lock nut, this adjustment being made instantly and with one hand. The device is of all metal construction, and the bayonet-type lock on the container cover is leak proof. An elevated air vent is a feature, it being claimed that the gun can be turned almost upside down without leaking. Provision is made to obviate dripping of paint from the nozzle. Non-clogging and facility of cleaning are other features stressed.

Progress in Simplifying Steel Sash

Washington, March 22.—The committee appointed at a preliminary conference in March of last year to draft a simplification recommendation relating to solid steel sash presented its report to the National Committee on Metals Utilization here on Wednesday of last week. It is expected a general conference will be held about the middle of April to consider adoption of the recommendation, which covers a standard table on nomenclature and a standard list of types and sizes. The committee making the recommendation is comprised of Guy D. Bayley, the William Bayley Co., Springfield, Ohio, chairman; Milton T. Clark, Truscon Steel Co., Youngstown; Clarke P. Pond, David Lupton's Sons Co., Philadelphia, and W. C. Randall, Detroit Steel Products Co., Detroit.

A second international Conference on Bituminous Coal will be held at the Carnegie Institute of Technology, Pittsburgh, in November of 1928, according to an announcement by Dr. Thomas S. Baker, president of the institution. The statement is contained in the recently issued volume of proceedings of the first conference held Nov. 15 to 18, of last year.

Galvanized sheet-metal ware shipped in January showed a gain over December, 14 concerns having sent out 173,720 dozens valued at \$671,431, against 123,381 dozens valued at \$479,876, from 13 concerns in the earlier months. Figures of the Department of Commerce show production of 131,006 dozens of pails and tubs, and of 30,763 dozens of other items, in January.

REVISED EXPORT FIGURES

Final Totals Show Slight Increase, Both in Exports and in Imports of Iron and Steel

Washington, March 21.—In the most exhaustive detailed analysis of the kind ever made, the Iron and Steel Division, Department of Commerce, has prepared compilations showing the foreign trade in iron and steel in 1926 by both countries and commodities. The tables include 55 groups in the export and 37 in the import movement, the vast majority consisting of specific products. As finally revised, exports for last year are shown to have amounted to 2,167,213 gross tons while imports aggregated 1,110,469 tons.

Of the exports, the greatest amount to any single country went to Canada, which took 833,856 tons, while Japan ranked second with 260,361 tons. The highest total of any product going to Canada was 119,590 tons of plain structural shapes, while plates amounted to 118,392 tons. The greatest movement of any single product going to Japan consisted of 88,796 tons of black steel sheets. The heaviest export movement of any commodity was in tin plate, amounting to 250,782 tons.

Germany led as the source of imports in 1926, providing 271,250 tons; Belgium was second, with 229,702 tons. Of the imports, 445,773 tons consisted of pig iron, leading by far all other products; structural shapes and steel bars came next, totaling respectively 121,099 and 103,473 tons. Germany supplied 157,094 tons of pig iron and 15,925 tons of steel bars. Belgium supplied more than half of the steel bars, her total being 56,573 tons and more than two-thirds of the structural shapes, with 85,177 tons. The United Kingdom furnished 92,083 tons of pig iron, ranking second after Germany. India was third, with 83,311 tons. Of the 83,873 tons of cast iron pipe imported, 57,354 tons was credited to France and 22,248 tons to Belgium.

Large Increase in Bauxite Output

WASHINGTON, March 19.—Representing an increase of 24 per cent in quantity and 21 per cent in value, production of bauxite in the United States in 1926 was 392,250 gross tons, valued at \$2,415,200, as against 316,540 gross tons, valued at \$1,988,250, in 1925, according to a statement prepared by James M. Hill of the Bureau of Mines. Of the 1926 output, Arkansas produced 371,570 tons, an increase of 25 per cent over 1925.

The aluminum industry used 241,850 tons in 1926, compared with 173,040 tons in 1925 and 225,780 tons in 1924. Chemicals required 77,960 tons last year, compared with 67,420 tons in 1925 and 54,870 tons in 1924. Abrasives, refractories and cement absorbed 72,440 tons in 1926, compared with 73,980 tons in 1925 and 66,920 tons in 1924.

Imports of bauxite in 1926, at 281,644 tons, represented a 20 per cent decrease from 1925. Exports increased 12 per cent, to 87,770 tons, going largely to Canadian and Norwegian aluminum plants.

Increasing Production of Automobiles

February production of motor vehicles in the United States totaled 298,359, the largest figure since last October. Except for February in 1926 and 1924, this is the largest February production on record. Of the total, 260,330 were passenger cars and 38,029 were trucks.

Wholesale Prices Still Falling

Prices of commodities in wholesale markets, as reported by the United States Bureau of Labor Statistics, have dropped in February to an average of 146.4, compared with 146.9 in January and with 155 in February, 1926. All these figures are based on 100 as the average in 1913. The present level is the lowest since June, 1924. With the exception of that one month, it is the lowest since April, 1922.

Metals and metal products have dropped from 124.4 in January to 122.2 in February. Only chemicals and drugs at 122 record a lower level. Except for clothing materials, which advanced from 167.3 to 168.7, and for

house furnishing goods, from 157.4 to 157.5, all the great groups declined from January. Highest position of all is held by fuels at 177.1, compared with 179.8 in January. Farm products at 136.9, while well below the general average, are higher than the metals.

Bookings of Fabricated Structural Steel

Actual tonnage of structural steel booked by 189 firms in February aggregated 188,822, being 69 per cent of capacity, as reported by the Department of Commerce. The computed tonnage for 220 identical firms works out at 219,420 tons. This is a sharp increase over the 171,720 tons of January and, with the exception of December's 225,780 tons, is the largest amount since last August. In February, a year ago, the total was 184,440 tons.

Shipments fell well below bookings in February, being computed at 181,260 tons. This compares with 174,900 tons in January and with 213,060 tons in December. In February, 1926, computed shipments were 190,800 tons.

Railroad Operations in 1926

Freight traffic over American railroads in 1926 increased 6.8 per cent over the previous high record, made in 1923, and 7 per cent over the 1925 figure. Publication No. 42 of the Bureau of Railway Economics, Washington, carries a mass of pertinent information in tabular and graphic form dealing with the operations from a wide variety of viewpoints. The net ton-miles, representing the freight work of the roads, is given for 1926 as 488,578,000,000. Revenue carloadings at 53,310,000 made a new high record and for the first time exceeded an average of 1,000,000 per week.

Operating revenues amounted to \$6,449,000,000, an increase of 4.2 per cent over 1925. Operating expenses aggregated \$4,715,000,000. New locomotives installed during the year numbered 2399. They were exceptionally large units, averaging 56,512 lb. of tractive force. They replaced locomotives of smaller size and power, so that the average per locomotive in service rose from 40,626 lb. to 41,783 lb.

Freight cars installed during 1926 numbered 96,753, compared with 125,760 in 1925. Here again the average capacity increased heavily, resulting in raising the capacity of cars from 44.7 tons each to 45.3 tons.

Railroad Employees Show Results

Labor productivity on railroads in the United States is reported by the Bureau of Labor Statistics to have increased about 40 per cent since 1915. For all employees on Class I railroads there has been an increase of 150 per cent in productivity since 1890. The percentages are based on the number of traffic units per employee for the period 1890 to 1915, and on the number of traffic units per "hour of duty" from 1915 to 1926. The increases have been almost uninterrupted. No attempt has been made, however, to apportion credit for the enhanced employee output to increasing efficiency of labor, introduction of new machines or processes, better management or increased traffic.

Reduced Production of Steel Barrels

February production of steel barrels reported by 28 companies to the Department of Commerce showed 504,134 units manufactured. This compares with 529,-137 in January and represents the lowest total since October. In February, 1926, production was 522,486 barrels. Unfilled orders at the end of February included 252,012 units for delivery within 30 days and 1,411,760 for later delivery.

Members of the Steel Barrel Manufacturers' Institute report a February business of \$1,096,367, compared with \$1,245,680 in January. Producing capacity was occupied 47.6 per cent, against 51.7 per cent in January. Daily capacity for I. C. C. barrels was engaged 30 per cent in February; for light barrels, 52.7 per cent. Shipments of members aggregated 336,367 barrels, of which New Jersey received 104,186 units, New York, in second position, taking only 43,788. Export shipments consisted solely of 200 barrels sent to Canada.

British Mills May Quit Rail Cartel

Reported Considering Withdrawal-German Steel Merchants May Merge -Japanese Make Manganese Steel Rail Crossings

(By Cable)

LONDON, ENGLAND, March 21.

Pig IRON continues quiet as consumers have not responded to the reductions by Cleveland makers, maintaining that prices are still too high. Makers are employed on old orders, but contracts are being completed and further price reductions are considered inevitable.

Hematite is weak as a result of increasing supplies and poor demand, although continental users are purchasing special grades of hematite. Foreign ore is dull.

The finished steel market is quiet but mills are well employed and giving good deliveries, but still in arrears on shipments. Shipyards are pressing for material due on contracts. Domestic business in structural material is active, but volume of new orders is small.

Tin plate is dull, with very few important business

transactions. Makers well booked are not keen sellers below 20s. 3d. (\$4.91) per base box. Those seeking orders have accepted down to 19s. 71/2d. (\$4.76) per base box, all f.o.b. works port.

Galvanized sheets are moderately active in small lots and prices are stiffening. Black sheets continue quiet.

Continental reports are current that the British mills are proposing to withdraw from the European Rail Makers Association, but no official confirmation can be obtained.

Continental business is slow and prices are weak-British users of semi-finished are well stocked and not inclined to commit themselves on contracts. Export demand for finished steel is poor. The Acieries Reunies de Burbach-Eich-Dudelange are shortly blowing in two furnaces at Esch, which have been idle since the armistice.

GERMAN MERCHANTS TO MERGE

Combination Would Control Majority of Warehouse Trade-Copper Institute Formed

HAMBURG, GERMANY, March 7.-Influenced by the success of mergers of steel producers into corporations, such as the United Steel Works, negotiations have been instituted by the large steel merchants in the West-phalian and Rhenish markets toward the formation of merchant steel corporation. Should these negotiations be successful, the corporation formed would control about 55 per cent of the merchant trade in Germany. No definite agreement has been reached as yet.

The intended visit to Italy of Fritz Thyssen and Dr. Volger of the United Steel Works, for the reported purpose of a conference with Premier Mussolini, was at first believed to be for the purpose of trying to gain the adherence of Italian mills to the International Raw Steel Cartel. It is reported now that the conference is probably for the purpose of arranging the sale of shares in the Austrian Alpine Montangesellschaft to the Italian Government. The Austrian company is owner of the so-called "iron mountain" and Italy is known to be desirous of securing about half this ore supply.

In the field of non-ferrous metals, the Copper Tube Cartel has been dissolved, effective March 31. The decision to end the cartel was a result of inability to make agreements with outsiders. Formed to function in the same field as the American Copper Research Institute, the German Copper Research Institute has finally been established. Members include the heads of the leading German non-ferrous metal works. An intensive publicity campaign to increase the use of copper and its alloys has been instituted through publication of pamphlets and by publicity and advertising in the business press and newspapers.

Following the unsuccessful negotiations at Paris for entry of the Polish tube mills into the European Tube and Pipe Association, it was reported that a price war between the association and the Polish mills was in prospect. However, the Polish mills have declared themselves willing to enter into new negotiations and

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.85 per £ as follows:

		,	77.7		-		*		
Durham coke, del'd. Bilbao Rubio ore† Cleveland No. 1 fdy. Cleveland No. 3 fdy.	1 4	6s. 2 5	to f	1	2½s.	\$6.30 5.33 20.61* 19.40*	to	\$5.45	
Cleveland No. 4 fdy. Cleveland No. 4 forge	3	19				19.15° 19.03°		10.00	
Cleveland basic East Coast mixed	4	15	to	4	15 1/2	18.18	to		
East Coast hematite Rails, 60 lb. and up	7	7½ 15	to	8	8 1/2 5 10	21.22 37.58 35.16	to to	40.01	
Ferromanganese	16	0	to		10	77.60	10	00.01	
(export)	15	15				76.38		X	
bars, Welsh	6	5	to	6	10	30.31		31.52	
Tin plate, base box. Black sheets, Japa-			- to	1	0 1/4	69.11	to	4.31	
nese specifications	14	9					mar	Lb.	
Ship plates	9	10				1.84	her	3.201	
Boiler plates	11	0	to	11	10	2.38	to	2.49	
Tees	8	1914			234	1.86	to	1.98	
nannels	7	1714			736	1.70		1.81	
beams	7	1214			234	1.65	to	1.76	
bound bars, % to 3 in.	8	5	to	8	15	1.78	to	1.89	
Steel hoops	10	10	to		0	2.28	to	2.39	
Diack sheets, 24 gaga	11	5		-		2.44			
Cold rolled steel	15	5	to	15	7%		to	3.33	
Trip, 20 gage, nom.	18	0				3.91			

Export price, 6d. (12c.) per ton higher. Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

	P	er Me	trie	To	m)			
France Luxemburg		10s. 10 10	to to	233	15s. 15 15	\$16.97 16.97 16.97	to to	\$18.18 18.18 18.18
Basic pig iron: Belgium France Luxemburg Coke		5 5 5 18	to to	20.00	15 15 15	15.76 15.76 15.76 4.37	to to	18.18 18.18 18.18
Billets: Belgium France Merchant bars:	4	13 13	to		15 15	22.55 23.55	to	23.03 23.03 Lb.
Belgium Luxemburg France	2000	0 0	to to	20000	1 1 1	1.10 1.10 1.10	to to	1.11 1.11 1.11
Joists (beams): Belgium Luxemburg France	En caren	1 1 1	to to	515151	2 2 2 2	1.11 1.11 1.11	to to	1.12 1.12 1.12
Angles: Belgium 4-in, plates:	5	0				1.10		
Belgium (nominal) Germany (nominal) A-in. ship plates:	6	12				1.45		
Belgium Luxemburg Sheets, heavy:	6	2 2				1.34		
Belgium Germany	6	3	to	6	4	1.33	to	1.34

(a) Nominal.

a meeting will be held shortly at Düsseldorf, Germany. Included in the association are German, French, Belgian, Luxemburg and Czechoslovakian producers. Refusal of the Polish makers to join the association was based on the proposed allotment to them of only 5 per cent of the total production of the other members and disagreement with the suggested division of eastern European markets.

As a result of the failure of the Paris negotiations sharp competition ensued, members of the association drastically reducing their quotations to Norway, Sweden, Denmark and Finland and expressing willingness to meet any Polish quotation or quote even lower prices. This condition, which would probably have been extended to eastern European markets, the natural territory of Polish manufacturers, has been suddenly changed by the prospect of renewed negotiations for

Polish adherence to the tube association.

German consumers are again active buyers of French iron and steel products. Following the increase in value of the franc during September and October, French prices were too high, but now a considerable tonnage is being imported from France by German manufacturers. German domestic prices are strong and French quotations are sufficiently low to make importation of steel profitable despite the tariff. During January, imports from France included 32,505 metric tons of semi-finished material, bars and beams, compared with 14,620 tons in January, 1926. Imports of hoops totaled 4183 tons, sheets and plates 2118 tons, wire rods 2553 tons and wire products 1445 tons.

Representatives of the German, Dutch, Belgian and Czechoslovakian wire industries will meet at Düsseldorf, March 16, to sign the final contract for a syndicate. Austrian wire mills are being approached and it is expected that French makers will join the syndicate before long. It is believed that, with the syndicate operative, export prices will be advanced about 5s. (\$1.20) per ton on all galvanized products, about 3s. (72c.) on black, japanned and annealed wire and about

4s. (97c.) per ton on nails.

MORE GERMAN OPEN-HEARTH

Bars, Shapes and Sheets Lead in Bessemer Product But Plates Are Changing

HAMBURG, GERMANY, March 7 .- Consumers of steel and hardware in Germany are more and more specifying open-hearth instead of Thomas steel. Despite the difference in price of about \$1.10 per gross ton between the open-hearth and Thomas product, consumers show

preference for the open-hearth.

Prior to the war, the tonnage of mild steel used in the manufacture of rivets of all kinds was about equally divided between open-hearth and Thomas grade. Today about 90 per cent of the steel consumed in the manufacture of rivets for shipbuilders, machine shops and the railroads is open-hearth. Practically the same shift in the kind of steel used has taken place in bolts, nuts and screws. Open-hearth rods and bars are now in general use in Germany for the production of screws and practically all the bolts sold in Germany are made from open-hearth steel.

In sheets, the greater part of production is still of Thomas steel, the relation of open-hearth to Thomas standing today at about 1 to 3. However, tracing the standing today at about 1 to 3. However, tracing the relation of the two grades in the output of the past few years, there is a steady increase in open-hearth production and a slight decrease in Thomas. In plates, the change in proportions has already appeared. Today about twice as many open-hearth plates are rolled as Thomas. The shipbuilding industry almost exclu-

sively specifies open-hearth ship plates.

In the production of reinforcing bars and structural material, output of Thomas steel is, of course, still greatly in excess of open-hearth production, although there is a slight increase in the output of open-hearth structural steel. In wire rods there is increased output of open-hearth but the relation is still about 40 to 100, although prior to the war this relation was 20 to 100. Wire makers selling to the German domestic trade are the largest consumers of open-hearth rods, manufacturers for export, where price is a primary consideration, taking Thomas steel.

EXPORT PRICES SOFT

Japan Wants Tie Plates-Oil Company Buys Tin Plate-Japanese Tariff Increase Delayed

NEW YORK, March 22.-Export demand continues light, and prices at which mills in the United States are willing to close business are soft. Among current inquiries from Japan are 20,000 tie plates for 100-lb. rails, from the Imperial Government Railways. The Ogura Oil Co. has awarded its 14,000 base boxes of tin plate to the Mitsubishi Shoji Kaisha, New York, which has placed it with a large American maker. Although tin plate prices are low in the export market, light gage black sheets for Japan, which are sometimes rolled on a tin mill, continue firm at a minimum of \$81 per ton, c.i.f. Japan. With the exception of a few small tin plate inquiries from Japanese consumers and merchants, the market is quiet.

There is an impression in Japanese export circles that European rail mills, through their participation in the European Rail Makers' Association, are distributing Japanese rail business among themselves, so as to equalize as far as possible the total tonnage taken by

the various adhering nations.

The Japanese Diet has decided not to take up the question of further increase in the tariff at this session. Consequently the present duties will continue

for another year.

Importers in New York are booking a fair tonnage of small orders of structural material and some bar business. Continental prices, however, seem to be rather irregular. Some importers are able to quote as low as 1.70c. per lb., base, for desirable specifications of plain steel bars, Thomas grade, while others quote from 1.75c. to 1.80c. per lb., base. Quotations on structural steel of Thomas grade are about 10c. per 100 lb. less than this base and corrugated bars are about 10c. per 100 lb. more.

Although importers are still receiving anti-dumping notices on shipments of German steel, it is believed in some quarters that decision by the Treasury Department will be almost exclusively on the question of injury to American business, with very little stress placed on the question of price at point of origin as compared with the export sales price.

Large Tonnage of Off-Grade Rails to Be Sold as Scrap

HAMBURG, GERMANY, March 7.-A steel dispute between a producer and a consumer, involving a larger tonnage than at any time since the war, has just ended in favor of the consumer. In August, 1926, a Belgian mill sold through an exporter 30,000 tons of steel rails to the South African Railways. Shipment was made in October and November, and the rails inspected in South Africa in January. The consumer found the entire tonnage to be useless, the weight and tensile strength not being in accordance with the specifications given with the order. It has been decided, therefore, to sell the rails as scrap and the maker and the exporter, who handled the transaction, will take a considerable loss, the sales price having been about £180,000.

Japanese Plant Makes Manganese Steel Crossings

WASHINGTON, March 22.—The Daido Electric Steel Works, Ltd., Nagoya, Japan, has succeeded in making good manganese steel point crossings and will en-deavor to manufacture them in large quantities, according to a report from Consul H. T. Goodier, Nagoya, to the Department of Commerce. This is expected to reduce the importation of such railroad accessories from the United States and Great Britain and enable Japan even to export them to Chosen and Manchuria.

The Toledo Furnace Co., Toledo, Ohio, controlled by Pickands, Mather & Co., Cleveland, has placed a contract with Dwight P. Robinson & Co., New York, for the erection of a boiler house of 9600 hp. capacity. It will be equipped with three gas fired and two stoker fired boilers.

BOOK REVIEWS

Corrosion, Causes and Prevention. By Frank N. Speller. Pages xii + 621, size, 6 x 9¼ in.; 125 figures and 93 tables; selected bibliography of 14 pages. Published by McGraw-Hill Book Co., Inc., New York. Price, \$6.

The subject of the corrosion of metals is receiving increased attention everywhere. It is of great importance to all users of metals because of the serious losses caused by corrosion from exposure to atmospheric, underwater, underground, chemical or other conditions. Also vast sums are expended in applying the various preventive measures for protecting the metals against corrosion. Again, it imposes serious limitations to the use of various metals and many manufacturing processes are thereby seriously restricted and progress prevented.

Perhaps most attention has been drawn to the great losses and expense caused by the corrosion of iron and steel, and undoubtedly this phase of the subject is most readily apparent to the ordinary public. Steel sheets, whether galvanized or not, rust and corrode with the lapse of years. Steel fence wire has to be replaced from time to time. Steel bridges and other structures are constantly being scraped and repainted, and steel ships are periodically placed in dry dock for the cleaning of their hulls and the application of anti-corrosive and other paint coverings.

There is naturally a vast amount of literature concerned with this subject of corrosion. The appendix of Doctor Speller's book gives a selected choice of articles from a carefully compiled list of over 7000 titles, and other extensive bibliographies have been prepared. The book under review makes thorough use of this widely scattered literature, references being given on almost every page.

The book is divided into two almost equal parts. Part I of seven chapters deals with corrosion in general, and Part II, of eight chapters, takes up methods for the prevention of corrosion. Following these comes the classified list of selected references on the corrosion of ferrous metals, of 14 pages, an appendix covering

various matters, a subject and an author index.
Part I may be taken up first: There is a short introductory chapter drawing attention to the great importance of corrosion, particularly of iron and steel, and suggesting the formation of an institute for corrosion research. Chapter 2, in many respects, is one of the most important in the book. It is on the nature and mechanism of corrosion and the theories of corrosion. Because of the attention given, it constitutes a splendid and clear discussion of the electrochemical theory, which is considered as the correct theory to follow in light of the known facts and is made the working theory of the book. This is a hard chapter to read. Indeed, it cannot be read casually or skimmed over but has to be studied carefully, because of the great wealth and detail of material compressed into a comparatively

few pages.
Chapter 3 is on the influence of methods of manufacture and treatment. Like most of the chapters, it relates principally to iron and steel. It is a thoughtful discussion of the methods of manufacture, etc., as related to corrosion. The general conclusions reached are that the internal conditions are subsidiary to the external conditions, but careful attention is drawn to the effect of internal structure, removal of roll scale, the

effects of strain, etc.

Chapter 4 takes up the effect of composition dealing with the usual elements found in iron and steel. A special and exhaustive section is devoted to the influence of copper, which has become so important in material exposed to atmospheric corrosion. The latter part of the chapter takes up the alloy steels and a valuable table is given showing the relative corrodibility of uncoated ferrous alloys under highly corrosive conditions.

Chapter 5 deals with the influence of factors external to the metal, again considering chiefly iron and steel. It is a long chapter and takes up the results of a great deal of experimental work, principally on sub-merged corrosion. The great effect of external condi-

tions is clearly brought out. Chapter 6 takes up the very important subject of the principles and methods of corrosion testing. At present there is not sufficient cooperation between the workers on corrosion, and progress cannot be properly made until standard methods of testing have been worked out. This applies particularly to the methods for carrying out accelerated tests, which will give results agreeing with actual practice and with long time exposure tests. Doctor Speller deserves great credit for having calculated, throughout this book, the results of many workers into uniform final results, namely, average penetration in inches per year. In the appendix a method is given for calculating corrosion rates

in this way.
Chapter 7, the last chapter of Part I, deals with the controversial and important question of the relative corrosion of the various ordinary ferrous metals. A great deal of important material is presented, gathered from many sources. The "ingot iron" referred to on page 240 is what we would call low carbon steel, and is not the material we are familiar with as American ingot iron. The first part of the chapter devotes much space to wrought iron and steel. The conclusions reached are that wrought iron possesses some advantage in regard to atmospheric corrosion over ordinary steel, but this advantage is questioned when compared to copper-bearing steel. No great difference is found between ordinary wrought iron and steel when exposed to corrosion in hot or cold fresh water, sea water or underground.

Part II will be considered by many the most practical part of the book. It deals with the preventive measures to be applied and covers its subject in eight chapters. The first and longest is on the prevention of corrosion in the atmosphere. Much attention is devoted to the various protective coatings, particularly paints and painting, and many valuable recommendations are made. The metallic coatings are also taken up in some detail, even including a brief discussion of

chromium plating.

The next chapter, No. 9, is on the prevention of corrosion underwater. It will prove of great value to civil and hydraulic engineers interested in the use and transportation of water. Considerable attention is again paid to protective coatings, particularly cement and concrete. There is also a long discussion of the various protective scale coatings, that form naturally, and of their value. These coatings may be induced to form by treatment of the water and suggested treatments are given.

Chapter 10 is on a subject that the author has been actively concerned with for many years, namely, the prevention of corrosion in closed water systems. In this field he is rightly looked upon as an authority. The gases dissolved in the water, particularly oxygen, are the main source of the trouble and the chapter is largely a discussion of methods of de-activation and de-aeration. Both chemical and mechanical means are gone into thoroughly. It is a good chapter, one of the best in this excellent book.

Chapter 11 is of particular interest to those engaged power production, dealing with the prevention corrosion in high-pressure steam plants. It is thorough and detailed on the treatment of boiler feed water. Chapter 12 follows naturally and takes up the prevention of corrosion in steam and hot water heating systems. Much attention is again paid to the oxygen content of the water or steam.

Chapter 13 is of chief value to those engaged in chemical engineering. It is headed "Chemical Corrosion," which is explained as the corrosion of engineering materials in contact with "chemical" corroding agents, as distinguished from atmospheric, natural water, underground or similar types of corrosion. Much

valuable data and many interesting tables are given. In particular there is a good discussion of Duriron, but not much detail is given on the stainless steels.

Chapter 14 takes up the interesting subject of prevention of corrosion underground. Not much is known of this problem and only recently has a start been made in its careful study. The chapter is largely, therefore, a report of progress of the careful work being done, although there is much excellent material on protective coatings and suggestions covering drainage, proper laying of pipes and soil treatment. The brief section laying of pipes and soil treatment. on "Refinery Corrosion" should probably have been included in the preceding chapter on chemical corrosion.

The final chapter, No. 15, is on the important subject of stray-current electrolysis written in conjunction with the American Committee on Electrolysis. chief recommendations are in regard to the leakage and prevention of leakage of current from street rail-

road lines.

One special feature of the book has not been sufficiently emphasized. That is the collaboration Doctor Speller has freely received and used from other workers in the field of corrosion. Whole chapters and numerous sections have been prepared by those specially fitted to deal with the subjects taken up. Their help is freely acknowledged and the book is thereby made still more valuable. Enough has been said to show that the book covers its subject of corrosion, chiefly corrosion of iron and steel, in a splendid way. There is no question as and steel, in a splendid way. to its timely nature and it can be thoroughly recom-mended to those interested in the subject either as manufacturers, research workers, engineers or users of G. B. WATERHOUSE.

Personnel Administration: Its Principles and Practice. By Ordway Tead and Henry C. Metcalf. Pages 543, 6 x 9 in. Published by the McGraw-Hill Book Co., New York. Price, \$5.

"Of making of many books [on Administration] there is no end." Solomon was right. But this book (now in the second and revised edition) is somewhat different from, and better than, most on that topic; and could be of use to any executive, as well as to the

personnel manager.

The authors' thesis is that "in industry, as in the rest of life, individuals are not means to the ends of other individuals," but that each is an end in himself, with a unique, significant, precious personality. is a good thesis when it does not conflict with the most

golden of all rules.

The book is a good pointer and suggester to the progressive personnel manager with the love of man as deeply implanted in his heart as the love of his employer's dollars. It is blocked out into chapters dealing respectively and quite exhaustively, considering the space allowed, with the reasons for and the functions of a personnel department, sources of labor supply and methods of selection, the worker's health, education of executives, foremen, and employees generally, shop rules, job and labor analysis, labor turnover, wage determination, departmental coordination and joint relations of employers and workers.

It is a good program, carried out with knowledge of the material available, and the ability to draw correct and useful conclusions therefrom. Each chapter is followed by a list of selected references; and there

is a quite good alphabetical index.

Five rather complicated charts refer to organizations necessarily having a very numerous working and clerical force. It would have been a great advantage if more charts could have been given, adapted to establishments having, say 50, 100, 250 employees besides the administrational workers. It is exactly these, especially in that sore point of American industry, the needle trades, in which ignorance and unreason of the highly specialized workers call for a sound understanding of racial mental make-up and environment, and the ability to cope effectively with insidious and blatant "organizers," whose chosen task is to foment disaffection and hatred. In such establishments the personnel manager, if he exists as a separate entity, must be a super-man. The Tead-Metcalf book will not make a super-man out of a mere human being, but it can show him many things to avoid, many traits of employees (and of employers!) to utilize; many ways of moral jiu-jitsu, by which opposing forces may be made to overthrow themselves.

Labor turnover is not handled nearly so well as by Schlichter, but the latter's monumental work has been utilized fairly well, and reference is made thereto. Perhaps, in view of the excellent tabulation of causes of excessive shifting of labor, more attention might have been paid to methods of preventing a high turnover percentage; the diagnosis is excellent, but a little more therapeutics is indicated. The task is, however, rendered more difficult by the fact that most of the research work in this connection has been done on the assumption of a definite output of product, and a constant number of workers; also a sufficient number of environments and of industrial branches has not been studied.

As to methods of payment, employees' ownership, etc., the financial problem has been complicated by the existence of prejudices on both sides of the capitallabor fence. This handicap is disappearing from the fact that the "horny-handed son of toil" no longer confact that the "horny-handed son of toil" no longer confact. siders himself as one of the working class; in fact, the class distinction has been broken down by the workers themselves, whose prosperity is binding him to the spot.

The authors have not sufficiently dealt with problem of the five-day week and the short-work day; have not considered, as one writer puts it, "how far Ford can go," and how far and how long others could

go in the same direction.

But by and large, this is a good and useful book, and would be better and more useful after the second and the third reading that it deserves.

ROBERT GRIMSHAW.

The Ratio Chart in Business. By Percy A. Bivins. Pages, 177, 5½ x 8 in. 57 diagrams. New York, 1926. Codex Book Co., 461 Eighth Avenue. Price,

To the engineer, economist and statistician, no apology is needed for the logarithmic chart. Its value in depicting accurately rates of change in measured or observed quantities is so thoroughly established in their minds that its use becomes second nature. For those, however, not familiar with the why and wherefore of this method of presentation, this book has been prepared.

Knowledge of business graphics is presupposed. The text plunges directly into ratio plotting, but uses throughout the language of everyday business. It is intended for the average business man-not the technician. Interpretations of graphs have been freely injected. Even the drawings are every-day shop practice, as they would be made in a business office. No attempt at skilled draftsmanship was made, further than to have them easily legible.

In the foreword, Carl Snyder, of the Federal Reserve Bank of New York, pays a tribute to the ratio chart and its "vivid presentation of facts, permitting the exercise of judgment based on wide familiarity with the situation. Statistical control of business and elimination of haphazard guess-work are most evident facts of present

industrial tendencies."

Die Kaolinlager in Schlesien. (The China-Clay Deposits in Silesia. By Dr. ing. Egon Pralle. Pages 52, 61/2 x 9% in.; illustrations 9. Published by Will Knapp, Halle-on-the-Saale. Price, 3.50 marks.

This interesting pamphlet discusses the question of the endogenous versus the exogenous origin of Kaolin, popularly called by us China clay, and as the result of geological observations, the author decides that these deposits, at least, are exogenous. So that is that.

An Informative Booklet on Sheet Steel

The Inland Steel Co., Chicago, has just published a very informative booklet for buyers of sheets. It carries fairly complete descriptions of standard and special grades of sheets, among the latter being windmill stock, grain spout stock, range boiler stock, keg stock, locker stock and many others. Various data such as permissible variations, shearing, patent leveling, tolerances, widths and lengths rolled, thicknesses and weights are given. The booklet also contains standard extras and differentials.

High Frequency Electric Furnaces Under Working Conditions

By invitation of the Ajax Electrothermic Corporation, nearly 75 guests gathered at the new plant of the company at Ajax Park, near Trenton, N. J., on Tuesday, March 15, to witness demonstrations of some of the high frequency electric furnaces and other products which that company produces. Some of the guests represented companies as far away as Elyria, Ohio, and Detroit, and there were a number from the Schenectady and Lynn plants of the General Electric Co. There were also present several representatives of large steel companies.

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The demonstrations of the various equipment were carried out as scheduled, the morning program being repeated in the afternoon for those who could not be present earlier in the day. Among some of the equipment demonstrated was a 250-lb. Ajax high frequency steel melting furnace in which the crucible is fixed, the scheduled melting time for which is 20 min. Then came a demonstration of rapid steel melting in a 60-lb. crucible of the same type of furnace, the crucible being removable for pouring. Various types of oscillator furnaces for laboratory use were also displayed in working condition.

The use of the company's 150-kw. motor-generator set, as well as of the static converter operating with a transformer, a discharge gap and condensers, were of interest. A melt of 150 lb. of metal was made in about 20 min. and one of 250 lb. in about 20 min., the relative rapidity of the latter being due largely to the fact that the furnace was of the tilting type which is emphasized as somewhat more efficient than the type having a removable crucible. The power drawn from the high frequency generator was in the neighborhood of 150 kw. in each case. The demonstration of an electric continuous rod heater created particular in-

A luncheon was served at the Stacy-Trent Hotel, Trenton, the printed menu for which contained many novel designations such as "medium frequency soup," "chicken a la Ajax-Northrup," "peas au Clamer," "fast melting ice cream," "temperature controlled coffee" and "continuous cigars." G. H. Clamer, president and general manager of the company, delivered an ad-

dress at the luncheon in which he gave an outline of the history of the development of high frequency electric furnaces and the possibility, as well as the probability, of the development of larger units which will take care of the melting of steel in large tonnages. Another demonstration of a similar nature is planned in the near future.

Sheet Shipments Gain but New Business Falls

Customers of independent sheet steel manufacturers did not enter orders quite so freely in February as in the previous month, a decrease of 19,406 net tons being noted in last month's sales, or new business, as compared with January. February shipments, however, ran 22,393 tons ahead of those for January and exceeded the month's sales by 19,461 tons. The unfilled order total in most computations of business rises or falls in strict accordance with difference between shipments and sales, but comparison between the unfilled orders as reported by the National Association of Sheet and Tin Plate Manufacturers on Feb. 28, and Jan. 31, shows a decrease of only 13,548 tons.

February production scored a substantial increase over that for January and fell only about 17,000 tons under February last year, when output was over 100 per cent of theoretical capacity. Orders on hand awaiting shipment decreased 6241 tons in February, but there was an increase in unsold stocks of 2194 tons. The figures in detail follow:

	192	7	19	26
The state of the s	February	January	December	February
Total No. of mills Capacity per month Percentage reporting Sales Production Shipments Unfilled orders Unshipped orders Unsold stocks	712 397,500 73.5 241,951 282,171 261,412 513,002 110,446 47,168	712 422,400 73.5 261,357 256,856 239,019 526,550 116,687 44,974	712 446,100 73.8 240,862 238,345 219,498 529,940 111,011 49,182	712 396,550 75.0 181,101 299,553 290,026 523,882 113,797 51,648
Perc	entages to	Capacity	1 . A	
Sales Production Shipments Unfilled orders. Unsold stocks.	90.3 177.2 38.1	84.9 83.5 77.7 171.1 37.9 14.6	73.1 72.3 66.6 160.8 33.7 14.9	61.0 100.9 97.6 176.4 38.3 17.4

New Books Received

Patents. By Roger Sherman Hoar. Pages 232, 5% x 8½ in. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, \$4.50.

A Geographical Study of Coal and Iron in China. By Wilfred Smith. Pages 83, 5½ x 8¾ in., illustrated. Published by the University Press of Liverpool, 177 Brownlow Hill, Liverpool, England. Price, 5s.

Warm-Air Furnace Heating. By A. M. Daniels. Pages 449, 6¼ x 9¼ in., illustrated. Published by Edwin A. Scott Publishing Co., 45 West Forty-fifth Street, New York. Price, \$5.

Marvels of Modern Mechanics. By Harold T. Wilkins. Pages 280, 6 x 8½ in., illustrated. Published by E. P. Dutton & Co., 681 Fifth Avenue, New York, N. Y. Price, \$3.

The Marketing Problem. By E. T. Elbourne. Pages 215, 5¾ x 9 in. Published by Longmans, Green & Co., 55 Fifth Avenue, New York. Price, \$4.

Ancient Egyptian Metallurgy. By H. Garland and C. O. Bannister. Pages 214, 5¼ & 8 in., illustrated. Published by J. B. Lippincott Co., Philadelphia.

American Institute of Chemical Engineers. Transactions, Vol. XVII. Pages 276, 6 x 9¼ in., illustrated. Published by the American Institute of Chemical Engineers and for sale by D. Van Nostrand Co., 8 Warren Street, New York.

Mechanical World Electrical Pocket Book, 1927. Pages 401, 4¼ x 6½ in., illustrated. Published by Emmott & Co., Limited, 65 King Street, Manchester, England. Price, 1s. 6d.

The Journal of the Iron and Steel Institute. Volume 113. No. 1. Edited by George C. Lloyd, secretary. Pages 748, 5¼ x 8¼ in., illustrated. Published at the

offices of the Institute, 28 Victoria Street, London, S. W. 1., England.

Clerical Salaries in the United States. Pages 59, 6 x 9 in. Published by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$1.50.

Recollection of Men and Events. By Joseph G. Butler, Jr. Pages 349, 6 x 9 in., illustrated. Published by G. P. Putnam's Sons, 2 West Forty-fifth Street, New York. Price, \$3.

Mechanical World Year Book, 1927. Pages 348, 4¼ x 6½ in., illustrated. Published by Emmott & Co., Limited, 65 King Street, Manchester, England. Price, 1s. 6d.

The Economic Basis of Fair Wages. By Jacob D. Cox, Jr. Pages 139, 6 x 8½ in., illustrated. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, \$3.50.

Economic Problems of Modern Life. By S. Howard Patterson and Karl W. H. Scholz. Pages 615, 6 x 9 1/2 in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$3.

The Cost of Living in New York City, 1926. Pages 129, 6¼ x 9¼ in., illustrated. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, \$2.

Proceedings of the Lake Superior Mining Institute. Vol. XXV. Pages 291, 6 x 9 in., illustrated. Published by the Lake Superior Mining Institute, Ishpeming, Mich.

Journal of the Institute of Metals. Vol. XXXVI. Edited by G. Shaw Scott. Pages 785, 5½ x 8½ in., illustrated. Published by the Institute of Metals, 36 Victoria Street, London, S. W. 1, England. Price, 31s. 6d.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

STEEL production continues above normal, the February decline being not so much as usual.

Finished steel, after a long period of price stability, continues the definite downward movement of the past two months, in conformity with other prices.

Pig iron production, still heavily above nor-

WHILE the general opinion is that the impending bituminous coal strike will not cause serious disturbance, it is nevertheless true that just at present it is enough of a factor affecting the iron and steel industry to make definite forecasts on a statistical basis almost impossible. If there were no prospective strike, we would say that the industry is in the midst of a merely seasonal recovery, but that supplies are moderately in excess of demand, that stocks are accumulating, that forward orders are in small volume, and that the prospects would appear to indicate further sagging in prices, particularly in the cases of bars, billets, shapes and certain kinds of sheets.

As it is, the near future depends to a large extent upon strike developments. If the strike comes, and is strong and prolonged, fuel prices will advance and the fear of interrupted supply would cause considerable buying of iron and steel. If, however, the strike were weak and short, it would have slight effect on fuel prices, and the anticipatory buying already done would largely cover the situation.

Perhaps the best guess is that there will be a strike and that it will be neither so ineffectual as operators anticipate nor so effective as the unions hope. In that event, the situation would fall between the two extremes; that is, there would be a little further rise in mal, moved downward in February by more than the seasonal percentage.

It seems likely that a firmer pig iron market will develop before long, some irregular recovery being already discernible.

Scrap prices are about in line with pig iron and coke and are not likely to change much in the near future.

the prices of the most wanted iron and steel products, followed in a month or two by reaction.

Large Steel Output and Lower Prices

A S to steel, our first chart shows that production has been trending slightly upward since December. Usually in February there is a decrease in steel ingot production of about 3 per cent. The actual decrease last month was less than this percentage and our adjusted index rose to 104.4 of normal, against 103.7 per cent in the preceding month.

During the same period the unfilled orders of the Steel Corporation have declined and the decline has been at an increasing rate.

Naturally, under these conditions, the average price of finished steel declined, The Iron Age composite averaging 2.371c. in February in comparison with 2.425c. in January. A week ago the figure was 2.367c., a level held for four weeks. The statistical position does not seem strong and, but for the strike, would continue to indicate further weakness in steel prices.

Situation a Little Unusual

We find no exact parallel to the existing condition. It will be noted, however, that in each of the three preceding years the average price of finished steel has

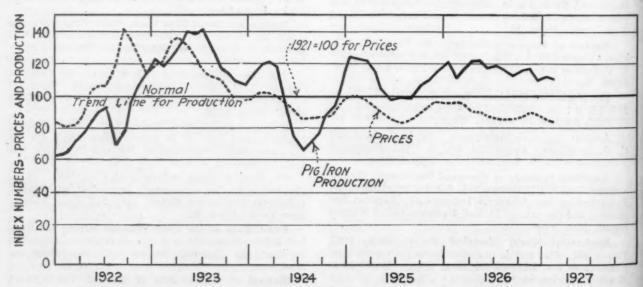


Fig. 1—Unfilled Orders Have Continued the General Trend of the Past 14 Months, But the Bottom Appears to Be Near. Ingot production remains slightly above estimated normal, while prices of finished steel have been sagging, after a long period of relative stability

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The Iron Age, March 24, 1927

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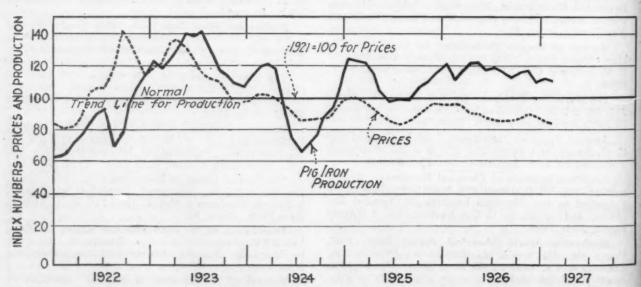


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Importance of Reporting of Freight Rate Cases

In the Iron Age of April 27, 1925, in discussing the decision in the Jones & Laughlin case, the most important steel freight rate proceeding of recent years, it was pointed out that the entire rate structure as far east as the Atlantic Coast might be affected. Today this has actually come to pass.

Hearings in a general inquiry into iron and steel rates in Official Classification territory are reported elsewhere in this issue. Intelligent reporting of all broad development in rates is recognized by this publication as an essential part of its service to subscribers. At a time when costs are commanding the closest attention, competitive disadvantages in freight, which often spell the difference between profit and loss, cannot be overlooked.

For News Summary See Reverse Side

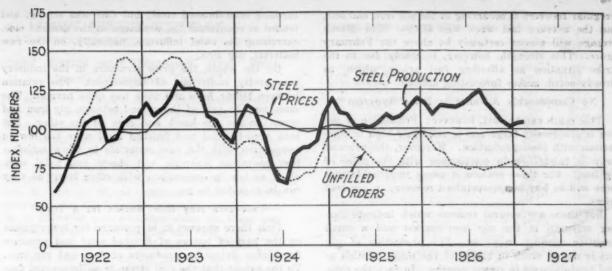


Fig. 2—Pig Iron Production Has Approached Closer to Estimated Normal, Though Still 10 Per Cent Above It. It remains high with relation to steel production. As a consequence, prices have continued their sagging course begun late in 1926

weakened in the early months, accompanied by lower unfilled orders. In these cases, however, the production of steel ingots, allowing for seasonal conditions, has also declined, while recently it has increased. This is not necessarily a less favorable situation, for the increase has thus far been so slight, and has carried the production curve so little above estimated normal requirements, that the supply situation is as strong as, or stronger than, it was a year ago (when the production was sharply curtailed in January and February).

The chief weakness lies on the demand side. It remains true that the rather sharp decrease in unfilled orders during the period between December and February indicates a reduction in the volume of new orders; otherwise prices would hardly have declined, with production increase at so moderate a rate. The unfilled orders are at the lowest point, considering the season, since September, 1924. The bottom seems near in this respect and, with the strike situation as a factor that may possibly cause higher prices, it seems probable that forward buying will show little if any further decline in March.

Pig Iron Output a Little Nearer Normal

USUALLY the production of pig iron decreases nearly 4 per cent in the short month of February. Last month, however, the output fell off more than 5 per cent. Thus there was more than the normal seasonal decline, and our adjusted index fell to 110.4 per cent of normal against 112.3 per cent in January. This means, in the first place, that the trend was slightly downward, and, in the second place, that the production of pig iron is still 10 per cent above estimated normal requirements. It will be noted, too, that, as steel production is only 4 per cent above estimated normal, the production of pig iron is relatively high compared with steel ingots, which makes the fifth month in succession that this situation has existed.

Naturally, the price of pig iron averaged lower in February, THE IRON AGE composite being \$19, in comparison with \$19.40 in January. Periods in which pig iron production is above normal and in which the production is at the same time declining are always periods of real weakness in pig iron prices. The last twelve months have been no exception. Now, however, some

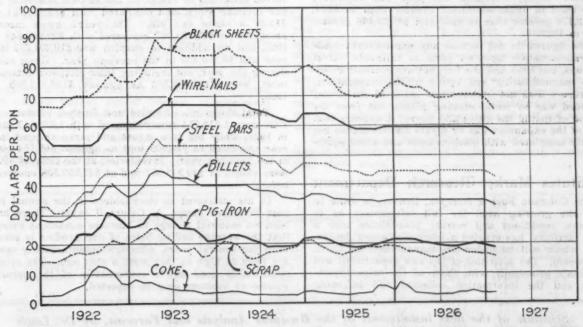


Fig. 3—While the Price Structure Depicted Above Is Badly Out of Adjustment, Some Portions of It Are in Accord With Each Other. The relation of billets to bars and nails may be regarded as about normal. So is the spread between pig iron and scrap. But both finished steel and semi-finished are too near the raw material level and sheets and nails appear to be as low as they can be expected to go

irregular recovery is occurring in the pig iron markets, and the average last week was \$19.04. The March average will almost certainly be above the February figure. This strength, however, is chiefly due to the strike situation as affecting fuel prices, which, as already noted, makes forecasting difficult.

No Considerable Advance in Price Apparent

This much can be said, however: Production of pig iron is abnormally large and is relatively high in comparison with steel production. Moreover, the price of scrap is fairly low in comparison with the price of pig iron. For these reasons it seems improbable that there will be any large, sustained recovery in pig iron prices.

But there are several reasons which indicate further strength in the pig iron market and a small irregular advance in prices. The production of pig iron is not so much in excess of the usual relation to steel production as in recent months. In fact, the ratio of the average daily production of pig iron to the average daily production of steel ingots has been declining for three months. Add to these facts the strike outlook and the possibility of higher fuel prices, and the reasons for recent advances in pig iron are apparent.

Some Maladjustment in the Price Ratios

JUDGED by the monthly averages, the general trend of iron and steel prices continued downward in February. Study of the third chart will show that the sharpest declines occur at the top of the list, that the declines were less sharp in the middle, and that an increase actually occurred at the bottom (coke). In other words, the more highly finished items of steel were the weakest, and this weakness was reflected back

through semi-finished steel; but fuel was strong, and tended to counteract the weakness on the demand side, exercising its chief influence, naturally, on the raw material, pig iron.

On the whole, the price structure in the industry was pretty badly out of adjustment. The relation between billets, bars and nails was quite normal. The same may be said of the spread between pig iron and scrap, on the one hand, and coke on the other. But both semi-finished and finished steel were too low in comparison with the raw materials to allow satisfactory operating margins, and sheets and nails were about as low in comparison with other items as they can be expected to go.

Producers May Rule Market for a Time

Thus there appears to be pressure for lower prices on the part of buyers of finished steel and pressure for higher prices by producers of fuel and pig iron. To the extent that the coal strike is an important factor, the pressure on the supply side is likely to be the predominant factor for another month or two, especially if buyers are convinced of this. If this conclusion is correct, pig iron will sell a little higher, semi-finished steel firm up and irregular advances occur in the most wanted lines of finished steel.

In spite of an above-normal production and considerable stocks, pig iron continues in a relatively strong position, and our barometers indicate a little further strength. There is some danger, however, of renewed overproduction, due to misjudging the probable effects of the strike.

Steel scrap appears in a highly irregular and uncertain condition. It seems probable that, after further irregular advances, the scrap markets will later weaken and decline again, perhaps by April.

Expansion of Industries of Massachusetts

The Associated Industries of Massachusetts has completed an industrial survey of Massachusetts, which shows that in 1926, approximately \$29,000,000 was expended by manufacturers of that State for additions to plants and for new machinery.

By these plant additions almost 5,000,000 sq. ft. manufacturing space was added to industrial facilities. In 1926 some 6000 more workers were employed than in 1925. Money expended last year was \$4,636,110 more than in 1925, \$3,073,427 greater than in 1924, \$9,663,176 greater than in 1923 and \$8,722,466 greater than in 1923.

than in 1922.

The figures do not include any expenditures made by transportation agencies such as railroads, street railways, bus lines and the like, but are confined strictly to manufacturing and public utility corporations. The report does not indicate how much of the money expended was by metal-working plants, but from the method of listing the cities and towns, it appears that most of the expansion was by plants and industries not directly associated with machine tools and allied equipment.

Institutes Market Research Department

The Colorado Fuel & Iron Co., Denver, in order to meet the growing need for full information as to economic conditions and market possibilities over a large territory, has created a market research department which will be under the management of C. H. MacDonald. The activities of the new department will coordinate principally with those of the sales department, and the information collected will be made

available to that department for use in furthering the sale of the company's products. Sales representatives will cooperate with Mr. MacDonald in the collection of data

Youngstown Sheet & Tube Co. Continues High Earnings

Net income during 1926 of the Youngstown Sheet & Tube Co. totaled \$15,148,876, equivalent after preferred dividends to \$14.32 on the 987,606 shares of no par common stock, and compared with \$13,227,721 or \$12.38 a share in 1925. The year's gross income amounted to \$33,139,007 compared with \$29,969,849 in 1925, and an addition to surplus was \$10,201,675 last year and \$8,280,420 in the previous year. Gross sales during the year, not including inter-company transactions, were \$152,508,503 as against \$136,513,585 in 1925.

Total shipments of rolled and finished products in 1926 were 1,619,714 tons compared with 1,529,817 tons in 1925, while pig iron ingots and scrap shipped last year amounted to 944,909 tons as against 865,754 tons in the previous year. Inventories, at the close of 1926 were valued at \$49,513,567 and at \$47,252,508 one year before.

In his statement to stockholders in the annual report President James A. Campbell says: "There has been no material change in business conditions except that the average selling price of our product is lower than for several years, although manufacturing costs are fully as high as they were a year ago. The credit situation is good and a continuation of the present volume of business may be expected."

Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: March 31—General Business Outlook; April 14—Activity in Steel-Consuming Industries; April 21—Position of Iron and Steel Producers.

NEW RIVET EXTRAS

Reduced Extras and Increased Base Price Partly Offset Each Other

NEW extras for large rivets have been issued by leading rivet manufacturers, to become effective April 1. These are based on present relative manufacturing costs. It is claimed that for some time many of the prices have been out of line, so that, while a profit could be made on some types or sizes, there was a loss on others. In the new list there are only two base diameters, % and % in., as compared with four base diameters in the old list. Formerly rivets 1 in. and 1% in. in diameter were also base sizes, but these now take small extras. Base lengths now run from 2 in. to 5 in. inclusive; in the old list (of Sept. 1, 1923) the 5-in. length was an extra and so was the 2-in., all lengths in between taking the base price. The extras as a rule have been reduced sharply, and it is the intention to offset this reduction by an advance in the base price.

No Extra for Boiler Rivets

No extra is included for boiler and tank rivets. These formerly carried \$4 a ton extra, which was eliminated recently. No change is made in the list price of small rivets.

Illustrative of the changes in prices at Pittsburgh on certain sizes and lengths of rivets are the characteristic items compared in Table II.

TABLE I-STANDARD EXTRAS FOR LARGE RIVETS

Per 100 Lb.	New List, April 1, 1927	Old List, Sept. 1, 1923
1/2-in. diameter	35c.	75c.
in. diameter	(a)	\$1.00
%-in. diameter	15c.	35c.
la-in. diameter	(a)	60c.
in., in. and 1 in in. diameter	(a).	25c.
1-in. diameter	5c.	base
1%-in. diameter	15c.	base
14-in. diameter	25c.	(b) 25c.
Length, 1 in. and shorter	25c.	75c.
Length, 1 in. to 11 in. inclusive	15c.	25c.
Length, 2 in	base	25c.
Length, 5 in	base	50c.
Length, over 5 in	25c.	50c.
Steeple heads	25c.	45c.
Standard countersunk heads	25c.	45c.
	15e.	45c.
Pan heads		70c.
Bull heads	(e)	70C.
Cone or button head boiler and tank		00-
rivets	base	20c.
Swell necks	10c.	25c.
Annealing rivets for cold driving	50c.	50c.
Rivets packed in 100 to 199-lb. kegs		40c.
Reinforcing kegs or packing in bags		
for export—net extra per package		25c.
Broken packages of less than 100 lb. of a size—net extra per package		\$1.00
or a pine net catta per pacaage.	42.00	42.90

(a) Same extra as next smaller diameter, plus 25c. net per 100 lb.
(b) And larger diameters, if any.
(c) Not quoted separately, but "special shape or sized heads, other than style or standard above listed, price on application." This applies also to shapes and sizes not in old list.

TABLE II-NEW EXTRAS COMPARED WITH OLD

Per 100 Lb.		New Price	Old Price
Base price		\$2.75	\$2.30
1/2-in. rivets, 1 1/2	in. long		3.30
½-in. rivets, 2½	in, long	3.10	3.05
H-in. rivets, 3	in. long		2.90
1 -in. rivets, 3	in, long		2.30
1 1/6-in. rivets, 4	in. long		2.30
1¼-in. rivets, 4	in. long		2.55
14-in. rivets, 5	in, long		3.05
11/4-in. rivets, 6	in. long	3.25	3.05

STEEL WORKS CENSUS

Production Value in 1925 Somewhat Lower Than in 1923

STEEL-WORKS and rolling-mill products are reported upon by the Bureau of Census for the calendar year 1925, with comparisons with 1923—the next preceding census year. Principal among the items of information are as follows:

Establishments numbering 473 in 1925 employed 370,726 wage earners, as an average during the year. This compares with 388,201 wage earners in 489 establishments in 1923. Wages were reduced from \$637,-825,137 to \$614,984,982 in 1925, but the average per man went up from \$1,643 to \$1,659. The total value of products showed a reduction of 6.6 per cent, dropping from \$3,154,324,671 to \$2,946,068,231. Total horsepower employed in 1925 was 4,763,533. Of interest are the capacity figures of steel furnaces and of mixers, shown in the table.

Some of the dollar values provided by considering the tonnages and total values of certain items reported by the Census Bureau are of interest. Ingots were sold in 1925 to the extent of 103,026 gross tons, valued at \$3,593,447, or an average of \$34.88 a ton. In addition, 432,113 tons of ingots figured in "interplant transfers," being listed at \$12,766,582, or \$29.55 a ton. Steel castings were sold to the extent of 893,382 tons,

valued at \$138,048,935, or an average of \$154.52 a ton. Interplant transfers of steel castings involved 44,330 tons and \$6,365,618, an average of \$143.60 a ton.

Finished rolled products and forgings sold or entering into interplant transfer aggregated 24,594,396. gross tons, valued at \$1,379,488,443, an average of \$56.09 a ton. This compares with 1923 figures of 25,-376,942 tons, \$1,545,621,466 and \$60.91 a ton.

Scrap production in 1925 was 13,149,233 gross tons. Of this amount 10,930,523 tons were consumed in the plants where produced. Sales aggregated 1,500,629 tons, while interplant transfers involved 718,081 tons.

Fabricated Steel Plate Bookings

WASHINGTON, March 22. - Bookings of fabricated steel plate in February amounted to 57,060 net tons and were at the rate of 76 per cent of capacity, according to reports received by the Department of Commerce from 45 firms. This compares with 34,068 tons in January, or 46 per cent of capacity. Of the February bookings, 32,983 tons was for oil storage tanks, 1756 tons for refinery materials and equipment, 3837 tons for tank cars, 2783 tons for gas holders, 606 tons for blast furnaces and 15,095 tons for stacks and miscellaneous purposes

Except for last November, with 59,897 tons, bookings of February represented the largest month in more than three years.

EQUIPMENT IN ACTIVE ESTABLISHMENTS, 1925 AND 1923

- The second lines		1	925		*		-	Increase		
Steel furnaces, total	Number of Establish- ments 259	Number of Furnaces 1,493	Daily Capacity, Gross Tons 203,851	Average Capacity 136.6	Number of Establish ments 252	of Number of Furnaces 1,496	Daily Capacity, Gross Tons 193,247	Average Capacity 129.2	in Total Capacity, Per Cent 5.5	
Open-hearth		1,141	144,699	126.8		1,135	131,658	116.0	9.9	
Basic Acid Electric	115 63 112	987 154 180	136,266 8,433 4,473	138.1 54.8 24.9	116 64 96	978 157 156	123,935 7,723 3,217	126.7 49.2 20.6	10.0 9.2 39.0	
Bessemer con- verters Crucible	4 79	102	54,289 390	532.2 5.6	49	105 100	57,723 649	549.8 6.5	-6.0 -39.9	
	Metal M	xers	-yulia,100 m	1925	1923	Increas	se, Per Cent		10 10 2	
TO THE STATE OF TH			age	93 44,736 481	43,785 471		0.0 2.3 2.3			

1926 BY-PRODUCT COKE

Record Production at 88 Per Cent of Capacity— 77 Per Cent Went Into Blast Furnaces

Washington, March 22.—Setting a record, output of by-product coke in 1926 aggregated 44,550,000 net tons, as against the previous highest total of 39,912,159 tons in 1925, an increase of 11.6 per cent, according to figures just presented by the Bureau of Mines. The production of beehive is estimated at 11,486,000 tons, or 1 per cent greater than that of 1925.

Production of all coke showed an increase of 4,769,000 tons, or 9.3 per cent, and amounted to 56,036,000 tons. The highest output of all coke was in 1923, with a total of 56,977,534 tons, while 1918 ranked next with 56,478,372 tons, followed by 1926. Last year was also notable for the high percentage of the total coming from by-product ovens, the beehive contribution being only 20.5 per cent of the total, the lowest on record, thus leaving 79.5 per cent of demand for by-product coke.

Pennsylvania, the largest producer of beehive coke, also of late years has become the largest producer of by-product coke, and since 1924 has produced more by-product than beehive coke. The output of its by-product ovens in 1926 was 11,617,000 tons. As a producer of by-product coke Ohio ranks second (7,428,000 tons), Indiana third, Alabama fourth and Illinois fifth. Of the by-product coke produced last year, some 36,780,000 tons, or 82.6 per cent, was produced by plants affiliated with iron furnaces.

77 Per Cent Used in Making Pig Iron

Allowing for imports and exports, the indicated consumption of coke in 1926 was 55,333,000 tons. Of this about 42,500,000 tons, or 77 per cent, was consumed in blast furnaces. The remainder was used in foundries, smelting non-ferrous metals, etc. Though blast furnaces are still the dominant element in the demand for coke, the other uses are increasing in relative importance, rising from 16.8 per cent of the total in 1920 to 23.2 per cent in 1926.

Three new by-product plants started production in 1926. During March the Rochester Gas & Electric Co., Rochester, N. Y., fired 37 of its battery of 60 ovens, the remainder going into operation in September. In April the Jones & Laughlin Steel Corporation put into operation its new plant at Aliquippa, Pa. In November the Consolidated Gas Co., New York, started making coke. Besides these new plants there were about 520 ovens added to plants already in existence. At the close of the year there were in the neighborhood of 900 ovens under construction, 65 of which were at two new plants.

Annual Capacity Over 50,000,000 Tons

With the addition of more than 650 ovens in 1926, the potential coke capacity of by-product plants at the end of the year, at 100 per cent operation, and all conditions favorable, amounted to 50,500,000 net tons, according to the bureau. Production in 1926 was thus at about 88 per cent of capacity. [This is considerably below the detailed estimate of 57,631,000 tons, made by the oven makers, and published in The Iron Age, Jan. 20, 1926, page 257.]

If all of the ovens now under construction are put into operation during 1927 as contemplated, the statement says, the coke plants will be capable of turning out, at 100 per cent operation, more than 56,000,000 tons. At this rate the plants in existence have a coalcarbonizing capacity of 72,000,000 tons of bituminous coal, which will be later increased to 81,000,000 tons through the addition of new ovens.

Accurate statistics of recovery of by-products from coke oven operations in 1926 are not yet available. The bureau submits the following preliminary estimates, which were obtained by assuming that the quantity of by-products recovered bore the same relation during 1926 to the known production of coke as in 1925:

HIGH PRODUCTION RATE

Malleable Castings Output, Shipments and New Orders Heaviest in Several Months

Washington, March 22.—Production of malleable castings in February totaled 62,761 net tons, against 50,785 tons in January, according to reports received by the Department of Commerce from 134 plants, four of which, with an aggregate monthly capacity of 3700 tons, were idle in February.

Orders booked in February were given at 57,320 tons, compared with 49,776 tons in January. The De-

Orders booked in February were given at 57,320 tons, compared with 49,776 tons in January. The Department statement says that a number of plants have been unable to report orders, the production of such plants in February amounting to 5008 tons.

Shipments in February were 53,897 tons, against 48,174 tons in January. The monthly capacity given for February was 104,006 tons, with operations at 60.3 per cent, against 105,669 tons, with operations at 48.1 per cent in January.

per cent, in January.

February production was the largest since last April and shipments the largest since September. Orders booked exceeded those of any month since last March.

Surplus Freight Cars in Good Repair Show Gain

Freight cars in need of repair on Feb. 15 totaled 136,056 or 6 per cent of the number on line, according to reports filed with the Car Service Division of the American Railway Association. Of this number 95,443 cars or 4.2 per cent were in need of heavy repair. The total number in need of repair on Feb. 15 was a decrease of 791 as compared with Feb. 1, while the number of cars in need of heavy repair on Feb. 15 was an increase of 606 over Feb. 1.

On Feb. 23 there were 273,153 surplus freight cars in good repair on Class I railroads, an increase of 13,597 over Feb. 15. Surplus coal cars on Feb. 23 totaled 78,069, an increase of 9696 within approximately a week. These railroads on Feb. 15 had 9866 locomotives in need of repair, or 15.9 per cent of the number on line, an increase of 610 as compared with Feb. 1. Serviceable locomotives in storage on Feb. 15 totaled 4817 compared with 4666 on Feb. 1.

February shipments of railroad locomotives, from principal manufacturing plants, based on reports received by the Department of Commerce, totaled 80 locomotives, as compared with 57 in January and 163 in February, 1926.

Will Assume Labor, Legislative and Welfare Work

The Structural Steel Board of Trade, Inc., New York, has announced its intention of handling labor policy, legislative and welfare work for its member companies. The board recently established an estimating and engineering department. General business and publicity matters have been taken care of since the organization of the body about 18 months ago.

The Mid-Continent Petroleum Corporation, Landreth Building, St. Louis, will soon begin the erection of an oil storage and distributing plant at Wood River, Ill., to cost about \$110,000 with equipment. Plans are being drawn by D. X. Murphy & Brothers, Louisville Trust Building, Louisville. T. M. Martin is secretary and general manager.

The response of industrial leaders and others of the country to serve in preparing mobilization plans "indicates conclusively that our industrial mobilization is no longer a mere fancy, but a reality," said Maj. Gen. Charles P. Summerall in addressing the convention of Quartermasters of the United States Army at Washington.

WIRE AND WIRE PRODUCTS

Census of Manufacturers Shows Slight Gain in Value in 1925 Compared with 1923

WASHINGTON, March 22.—According to data collected at the biennial census of manufactures taken in 1926, establishments engaged in the manufacture of wire and wire products in 1925 produced bare wire valued at \$224,863,241; insulated wire and cable, \$207,047,331; and other manufactures of wire, \$262,569,952; making a total of \$694,480,524, an increase of 0.4 per cent as compared with \$691,909,079 for 1923, the last preceding census year.

Production of bare wire in 1925 (exclusive of wire made and consumed in the same works in the manufacture of finished wire products) was as follows: Plain iron and steel wire, 906,243 net tons, valued at \$71,842,214; galvanized iron and steel wire, 249,132 tons, \$17,246,171; other coated iron and steel wire, 43,130 tons, \$5,198,271; cold-rolled flat iron and steel wire, 155,378 tons, \$18,858,628; plain copper wire, 252,380 tons, \$85,807,792; plain brass wire, 32,069 tons, \$12,-227,776; wire made of bronze and other non-ferrous alloys, 22,795 tons, \$13,682,389.

The total quantity of bare iron and steel wire manu-

factured in 1925, including that made and consumed in the same works in the manufacture of finished products, aggregated 3,965,472 tons, a decrease of 8.1 per cent as compared with 4,314,878 tons in 1923.

Wire and Wire Products, by	Value: 1925	and 1923
Produced In	1925	1923
Wire mills (establishments that draw wire from purchase rods) Wire departments of steel works	\$176,917,862	\$190,568,171
and rolling mills	201,459,482	217,844,264
copper rolling mills and other establishments	59,690,153	65,444,580
that use purchased wire as material		218,052,064
Total	\$694,480,524	\$691,909,079

Products manufactured from wire in 1925 were valued at \$469,617,283, an increase of 2.6 per cent as compared with \$457,672,996 in 1923. The leading items for 1925 are: Insulated wire and cable, \$207,047,331 (data as to quantity incomplete); nails and spikes, 15,977,435 kegs (of 100 lb.), \$53,623,415; rope, cable, and strand, 165,213 tons, \$46,658,757; woven-wire fencing and poultry netting, 492,269 tons, \$41,930,262.

BOLT PRICES MEAN SAVING

Producer Finds Customers Gain by 2½ Per Cent Under New Lists and Common Discount

It is a safe assumption that where bolts and nuts are made or used there has been extensive figuring as to what the new price lists mean in relation to former prices. It is a common assertion that consumers profit to the extent of about 5 per cent, but this estimate appears to be the result of taking the net prices obtained by applying the new uniform discount against the new lists and comparing them with what the former lists and discounts produced on every size of bolt made.

If there is a consumer of bolts who takes every size made, his identity is not known. The distribution is largely in classes taking either large or small bolts, with a smaller class taking large and small but no class that takes the entire gamut of sizes. What probably constitutes a fairer appraisal of the effect of the changes as they relate to consumers resulted from an analysis made by one of the largest producers in the country. This company took its 1926 sales record and, applying the new prices and discount to that record, found that its customers would have saved an average of 2½ per cent from what they paid under the old prices and discounts.

In the former method of quoting, published discounts on rolled-thread machine bolts applied to sizes

% in. x 4 in. and smaller and on rolled-thread carriage bolts, to sizes % in..x 6 in. and smaller. These groups included the sizes most actively dealt in, although providing a small percentage of the total volume. In the old lists, machine and carriage bolts of less than 11/2 in. in length were not carried; in the new list, the length is carried down to % in. A comparison of the net prices produced by the new and old lists and discounts, embracing ¼-in., 5/16-in. and ¾-in. cut-thread bolts, in lengths from 1½ in. to 4 in. on machine bolts and to 6 in. on carriage bolts, discloses quickly to an important consuming class what the new prices mean. former discount on machine bolts with cut threads was 50, 10 and 10 per cent, while on carriage bolts with cut threads the quotation was 50 and 10 per cent. Rolled-thread bolts in the new list take a 10 per cent lower price than cut threads in sizes % in. x 6 in. and smaller. It was the same in the old list, except that 4 in. in length was the limit on machine bolts.

Those responsible for the new lists believe they have simplified the figuring of net prices by applying the uniform discount since 70 per cent off means 30 per cent on and the multiplying of the list price by 30 per cent is simple compared with former application of multiple discounts. The new schedule is regarded as the most scientific revision ever made of bolt and nut prices, and since a close study of costs was the basis of the revision, it is believed that certain classes of consumers will no longer have to carry part of the burden of others.

COMPARISON OF NET PRICES UNDER NEW AND OLD LISTS AND DISCOUNTS

Machine Bolts (Cut Thread)

L PERMITTER STATE OF THE PARTY	-	-14-In	Land State of the land	1-311-11	%-In		21110	-%-In	
Length	New	Öld	Change	New	Öld	Change	New	Old	Change
1½ in	\$0.48	\$0.69	-\$0.21	\$0.69	\$0.81	-\$0.12	\$0.885	\$0.972	-\$0.087
2 in	0.54	0.73	-0.19	0.78	0.87	-0.09	0.975	1.053	-0.078
2½ in	0.60	0.77	-0.17	0.855	0.93	-0.075	1.08	1.13	-0.05
3 in	0.63	0.81	0.18	0.915	0.99	-0.075	1.17	1.215	0.045
3½ in	0.705	0.85	-0.145	0.99	1.05	-0.06	1,275	1.30	-0.025
4 in	0.915	0.89	+0.025	1.065	1.11	-0.045	1.38	1.38	
MANUAL MINES	o Atres	G 6 117	Carriage Bo	lts (Cut Ti	hread)		Jana		TOUR ME
1 1/2 in	0.45	0.45		0.66	0.63	+0.03	0.84	0.855	-0.015
2 in	0.495	0.495		0.72	0.70	+0.02	0.80	0.93	-0.013
2 ½ in	0.555	0.54	+0.015	0.795	0.765	+0.03	1.035	1.035	
3 in	0.60	0.585	+0.015	0.855	0.81	+0.045	1.125	1.125	
3½ în	0.66	0.63	+0.03	0.93	0.90	+0.03	1.23	1.215	+0.015
4 in	0.87	0.675	+0.195	1.005	0.97	+0.035	1.335	1.305	+0.03
41/2 in	0.915	0.72	+0.195	1.215	1.035	+0.18	1.425	1.395	+0.03
5 in	0.96	0.765	+0.195	1.29	1.10	+0.19	1.605	1.485	+0.12
5½ in	1.005	0.81	+0.195	1.35	1.17	+0.18	1.695	1.575	+0.12
6 in	1.05	0.855	+0.195	1.41	1.24	+0.17	1.80	1.665	+0.135
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THE IRON AGE

A. I. FINDLEY. Editor

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York C. S. BAUR, General Advertising Manager

F. J. Frank, President

George H. Griffiths, Secretary

Owned by the United Publishers Corporation, 239 West 39th Street, New York. A. C. Pearson, Chairman. F. J. Frank, Pres. C. A. Musselman, Vice-Pres. Fred C. Stevens, Treas. H. J. Redüeld, Secy. BRANCH OFFICES—Chicago: Otts Building, Pittsburgh: Park Building. Boston: 425 Park Square Building. Philadelphia: 1402 Widener Building. Cleveland: 1362 Hanna

Building. Detroit: 7338 Woodward Ave. Cincinnati: First National Bank Building. Buffalo: 835 Ellicott Square. Wash-ington: 536 Investment Building. San Francisco: 320 ington: 53 Market St.

Subscription Price: United States and Possessions, Mexico, Cuba. \$6.00; Canada, \$8.50; Foreign, \$12.00 per year. Single Copy 25 cents.

Entered as second-class matter, June 18, 1879, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

PRINTED IN U. S. A.

The Steel Corporation Report

THAT the Steel Corporation's proposed 40 per L cent common stock dividend represents a very moderate increase in the capitalization, in view of the improvements to properties made in the past quarter century, is a fair inference from figures shown in the corporation's report for 1926. The common stock outstanding has been unchanged from the beginning at \$508,302,500, while the preferred stock has been unchanged at \$360,281,100 since the conversion in 1903 of part of the original preferred issue into bonds. Of the first mortgage bonds, \$304,000,000, the amount outstanding has been reduced to \$179,866,000, while of the second bonds, \$200,000,000, there is \$160,236,000 outstanding. The bonds redeemed are no longer a capital charge but interest against them is paid into the sinking funds. Issues of subsidiary company bonds have been slightly increased.

Earnings have exceeded dividends, April 1, 1901, to Dec. 31, 1926, by \$1,005,254,086. Of this amount \$705,353,624 has been invested in property, the remainder of \$299,900,462 being in increased working capital. The 40 per cent common stock issue will amount to \$203,321,000.

The corporation had a very efficient operation in 1926. There was some additional abandonment of old equipment, none of this being in steel ingot capacity, which increased 1.8 per cent during the year, from 22,749,100 tons to 23,176,900 tons. Taking average capacity as the mean of the two figures, the 20,306,668 tons of ingots produced represented 88.4 per cent of capacity.

The ingot production was 43.1 per cent of the total ingot production of the country, while the corporation's proportion of the total capacity seems to be about 41 per cent. In 1925 the corporation made 42.8 per cent of the total ingot output, that being its smallest showing. Its steel production increased up to 1916, but not so rapidly as the production of independents. Not since 1916 has the corporation made as much steel as the 20,910,589 tons produced in that year. Starting with 67 per cent in 1901 and 1902, the corporation's proportion passed below 60 per cent in 1906 and below 50 per cent in 1917. These decreases were premeditated, not accidental, and there is no reason to suppose that a further decrease in the proportion is contemplated.

The Steel Corporation's production of steel products for sale increased 8 per cent from 1925 to 1926, while the earnings increased 20 per cent. The usual computation of dividing earnings by tonnage gives \$12.36 for 1925 and \$13.92 for 1926 as the nominal per ton earnings, an increase of \$1.56, while the report states that comparing similar materials and tonnages the average receipts per ton decreased \$1.28. Thus there is an indication, though, of course, not an exact measure, of reduction effected in production cost. Part of this was incidental to the heavier operation enjoyed last year.

When prices began mounting rapidly during the war, the Steel Corporation set up an inventory reserve to take care of subsequent deflation, and in the period 1916-20 the reserve so accumulated was \$95,000,000. At the end of 1923 the fund was down to \$51,220,055. In the next two years there was a little drawing upon it, but none in 1926, this reserve being \$50,143,280, or 15 per cent of the gross inventory, \$331,398,741.

NUSUALLY large shipments of steel from the United States are reported for January. At 215,235 gross tons the movement was 19 per cent larger than last year's monthly average of 180,600 tons, and in only one month since November, 1924, has it been exceeded. Boiler tubes, welded pipe and fittings, tin plate and steel rails were the largest items and next came galvanized sheets, black sheets and steel bars. In boiler tubes and fittings the January total was 42,300 tons as against 23,800 tons per month in 1926. There was a like increase in tin plates-41,800 tons in January as compared with 20,900 tons per month last year, in itself a record. Rails were 23,400 tons as compared with 15,650 tons a month in 1926. Black sheets and steel bars were about 1000 tons in excess of the 1926 monthly rate, and galvanized sheets about 5000 tons larger. The January movement is noteworthy after a year of such conspicuous export increases as were achieved in 1926. Nearly 70 per cent of the 405,000 tons gain made in 1926 over 1925 is to be credited to the Steel Corporation, its export shipments of iron and steel last year being 1,330,000 tons against 1,054,000 tons in 1925.

Andrew W. Mellon as Thinker and Writer

Not since Alexander Hamilton, who wrote so effectively in the Federalist, have we had a Secretary of the Treasury so gifted in sound economic thinking and in clarity and effectiveness of expression as Andrew W. Mellon. We recall with appreciation his incisive correspondence with Senator Couzens not very long ago and numerous other public communications. His last letter of this nature, to President Hibben of Princeton University, was true to his form.

In writing to President Hibben he was in reality addressing the faculties of Columbia and Princeton, the members of which had severally joined in recommending revision of the European debts to the United States. College professors are great men in their academic purlieus, wherein they talk to boys and are immune from being called to account. When they step out into the world some of them seem to be gifted in putting their feet into things, and the more collectively they step the worse appearance do they make. Secretary Mellon with his intellectual machine gun had no difficulty in shooting to pieces, figuratively speaking, these two faculties.

Our debt commission did a good job in making a composition of our foreign financial affairs, and caused Uncle Sam to be generous, no matter how he may be regarded by foreign critics and domestic college professors.

Industry and Utility Valuations

INDUSTRY is concerned in the controversies that have arisen in several States as to the basis of valuations upon which public utilities may reckon their service charges and their dividends. companies have claimed that a sound basis of property valuation is a fair replacement cost, and this view was taken by the United States Supreme Court in its recent decisions in the rate cases of the Consolidated Gas Co. of New York and the Peoples Gas Light & Coke Co. of Chicago. In November in the Indianapolis Water Co. case the Supreme Court held that a reasonable rate of return is not less than 7 per cent, also that if it does not appear probable that there will be a substantial change of prices "then the present value of lands plus the present cost of constructing the plant, less depreciation, if any, is a fair measure of the value of the physical elements of the property."

Certain public officials and a following among the consuming public disagree with the utilities as to what constitutes an equitable basis where the business is profiting through monopolistic rights granted by municipalities. They contend that the money actually paid in by stockholders in cash for their shares is the just basis. In Massachusetts, which for some time has been a storm center, the Governor of the Commonwealth and its public utilities commission hold to this view. The Governor has ordered an investigation of the affairs of the gas and electric companies of the State to find out if rates charged customers are too high because dividends have been greater than the 8 per cent (the rate fixed in the Federal Court decision) on money paid for their stock. That dividends have not exceeded 8 per cent on replacement value is considered of no importance. The utilities state that if the commission decides against them on this issue they will take their case to the Federal Supreme Court, with the purpose of establishing a principle once for all.

The utilities spend large sums of money each year for material and equipment. Progressive management requires that power-generating and distributing systems be maintained at a high point of efficiency. Replacements are constantly being made as better practice is evolved, and growth of business demands additions. It would be poor policy for public service companies to charge their customers unduly high rates. Experience has proved that the way for a gas or electric company to make the most money is to increase the consumption of its product, on the theory that the larger the units of manufacture the lower the production cost.

No utility should be permitted to pay excessive dividends, or to charge excessive rates. On the other hand there is such a thing as smothering enterprise by an uncompromising attitude of the municipality or State. Industry and the public will suffer in the end where regulation operates to cripple utilities in their buying power and to curb the natural ambition of managing officials to secure a fair financial return for their stockholders.

The Petroleum Situation

APART from its broad economic and industrial significance the petroleum industry has an intimate association with iron and steel in that its requirements for storage tanks, railroad cars, pipe lines and other equipment is no small factor in the total consumption of steel.

The petroleum industry from the standpoint of speculators and investors has been unsatisfactory for several years, although as a developing industry, requiring much iron and steel, it has been as greedy as any manufacturer could desire. Also, from the standpoint of the consumer of manufactured products of petroleum conditions have been satisfactory.

Production and consumption have both risen by leaps and bounds. The trouble has been with price. There has been a fatality in respect to bringing in new oil fields. Whenever it appeared that production was slowing up a new field would be brought in. The latest has been Seminole, which looks like the greatest of all. It looks, moreover, as if it had brought things to a head.

The petroleum geologists talk gravely about an eventual shortage of oil. They may be right, but their opinions have no weight with adventurers who are minded to get all there is in the shortest possible time. The geologists themselves, with their modern and efficient knowledge on finding petroleum, and the chemists with their improved methods of cracking it have contributed to the im-

mediate flood of oil. The scientists have veritably created a Frankenstein.

Although the consumption of petroleum products is greater than ever and is increasing, production has been increasing even more rapidly, and stocks in various forms in tanks are unwieldy and costly. The carrying charges are so great that no profit will ever be realized on much of the surplus production of the past.

The best advice to the petroleum business is that an agreement be made to suspend all drilling for a year, more or less, just as in 1921 the copper producers suspended production. The Department of Justice looked askance on what was done in copper, and probably would do likewise as to common action among petroleum producers, much more as to concerted action. However, it is difficult to see how the Department of Justice could make producers drill if they did not want to, although it might put them in jail.

Anyhow, economic law will do this very thing to a large extent. The price for petroleum will fall, perhaps has already fallen, so low as not to make it worth while to drill. Already in the Seminole field the value of crude oil has shrunk about one-half since production began there. This is a greater contraction than has occurred in the wholesale price for gasoline. The refiner has therefore acquired a certain advantage, tempering adversity.

In the broad view the law of demand and supply is applying its natural corrective to a bad situation, which is however so very bad that early improvement is not to be expected. There may be some further demand for tank plates to take care of the flood of oil, whereof the flow cannot be checked immediately, and some large interests may continue to drill lest others tap their pools. But for a considerable time to come a contraction in the demand for iron and steel products by the petroleum industry is to be anticipated.

Increasing Our Manganese Supply

NOTABLE in two respects was the 1926 record in manganese ore—large volume of imports and small volume of domestic production. Imports of high-grade ore last year were the largest in history—over 708,000 gross tons (reckoning two tons of ore to each ton of manganese as reported by the Department of Commerce)—about 33 per cent greater than the 1925 receipts of 531,300 tons and more than double the pre-war imports of 345,000 tons in 1913. The largest war receipts were 629,900 tons in 1917.

Despite the stimulus of a tariff, domestic output fell last year to 44,000 tons, or less than half the 98,300 tons mined in 1925—both insignificant as a contribution to the consumptive need. With steel output at a new peak last year, and with ferromanganese made in American furnaces exceeding previous records, the large imports are easily explained.

Seeing how dependent the American steel industry is upon foreign sources of manganese, some American metallurgists, particularly those of the United States Bureau of Mines, are giving deep thought to ways of using the manganese in our almost inexhaustible supplies of manganiferous iron ores, also to the recovery of the manganese now lost in open-hearth slags. There are signs that these researches will result in converting some of

this wealth of manganese into an alloy which will replace part of the metal now available only as ferromanganese made from foreign ores. Such experimentation should have every encouragement from the Government and the domestic producers of steel.

CEVERAL amendments to the patent laws were made at the last session of Congress. Any invention on which application for a patent is made after April 1, must be marked not only with the date of issuance, as at present, but with the number of the patent. Other changes are designed to speed up the conversion of an application into an issued patent, by making delays on the part of the applicant more difficult. The time permitted for the renewal of an application is reduced from two years to one, and the time for action on an application from one year to six months. Under the old law an applicant had the right of two appeals within the Patent Office-to the examiner and to the commissioner. These are now consolidated into a single appeal.

Coal and Steel Relations

I has long been recognized that coal and iron and steel production are closely related, it being generally found that a country that produces the one manages to produce the other. Which is cause and which is effect is another matter. Geologically coal and iron ore are usually found together, but the most important iron ore deposits of the world, commercially, those of the Lake Superior region, are an exception.

The Bureau of Mines has just issued a report on the coal production of the world in 1925, showing a total of 1,352,000,000 metric tons. Production of the United States constituted 39 per cent of the total, an interesting percentage in that it represents a reversion to the pre-war proportion, for each of the three years 1912, 1913 and 1914 showed a United States proportion of from 38.6 per cent to 38.8 per cent. On account of difficulties abroad, the United States proportion rose in the intervening years to 46.3 per cent in 1918 and 45.3 per cent in 1920, the one exception being our strike year, 1922, when we produced only 35.3 per cent of the world's total.

With a world production of 89 to 90 million gross tons of steel ingots and castings in 1925, there was a production of 15 gross tons of coal (including lignite) per gross ton of steel ingots and castings. The following table shows for the principal steel producing countries the percentages of coal and steel contributed to the world's totals, also the number of tons of coal produced per ton of steel:

	Cent Per Cent Tons Coal Coal in Steel to Steel	1
United States 3	9.0 51.0 11.4	
United Kingdom 1	7.6 8.3 31.7	
Germany 2	0.2 13.5 22.3	
France	3.5 8.3 6.4	
Belgium	1.7 2.7 9.6	
Luxemburg	0.0 2.3 0.0	
Saar	1.0 1.7 8.3	
the state of the s		
World 10	0.0 100.0 15.0	

The proportion of the United States, producing 11.4 tons of coal per ton of steel, to the world's production of 15 tons of coal per ton of steel is a perfectly reasonable one. It is natural for a

country to consume coal even if not steel, but to consume steel and not coal would be quite unnatural, and thus the world at large uses more coal relative to steel than does the United States.

Great Britain has an unusual proportion, producing more than twice as much coal relative to steel as does the world at large. The departure from the general proportion is due to geology, Great Britain exporting much coal and being at some disadvantage in steel making by reason of importing iron ore.

Germany has also, in less degree, an unusual proportion, having relatively more coal than steel production. That is under post-war geography. In 1913 Germany produced 15.7 tons of coal per ton of steel, when the world's proportion was 17.6 tons of coal per ton of steel. Germany then had a slight excess of steel, while now the excess is in coal.

Belgium, Luxemburg and the Saar are poor in native coal, but readily produce steel because the raw materials are easily obtained. France on a larger scale is in the same category, and all are natural exporters of steel.

THE IRON AGE was in error in one particular in the editorial on page 734, issue of March 10, referring to the new law providing for additional fees for patent claims in excess of twenty. The statement was made that "the bill became a law before most of the patent lawyers and solicitors were aware that such a change was contemplated." From the evidence before us it would appear that representative patent attorneys who lacked information of the proposed change were quite in the minority. Not only was there a representative from each of the patent law associations of New York, Philadelphia, Pittsburgh, Cleveland, Chicago and Michigan, as well as from the American Patent Law Association, on the committee which recommended the bill, but the national association sent a notice of it to all its members in 50 different cities.

Will Meet in Cleveland to Consider Mineral Supplies in Case of War

A meeting to discuss ways and means of assuring this country adequate supplies of various minerals, particularly manganese, in case of war and to formulate a government and industrial policy in connection with securing these supplies will be held in Cleveland, April 19 and 20, under the auspices of the Ohio section of the American Institute of Mining and Metallurgical Engineers. A large attendance of steel makers is expected. The meeting also will be attended by representatives of the Government.

Committees have been appointed to arrange for this conference, which include: Program, R. C. Allen, Oglebay, Norton & Co., chairman; H. Foster Bain, New York, secretary of the institute, Don G. Gillies, Corrigan, McKinney Steel Co., and Leonard B. Miller, Cleveland; publicity, H. K. Bourne, Oglebay, Norton & Co., chairman; hotel and dinner arrangements, C. M. Murray, Crowell & Murray, chairman.

Food prices at retail were 2 per cent lower in the middle of February than a month earlier, according to a report of the United States Bureau of Labor Statistics. Compared with a year earlier, the decrease was 3½ per cent. The prices represented an increase of 61 per cent over those of Feb. 15, 1913.

The seventh edition of "Brands of Fire Brick and Other Refractories" has been issued by the American Refractories Institute, Miss Dorothy A. Texter, secretary, 2202 Oliver Building, Pittsburgh.

CORRESPONDENCE

The Question of Engineering Education

To the Editor: Your editorial on "Junior Colleges and Engineering," in the Feb. 17 issue, raises some interesting questions.

First, there seems to be a misconception about the requirements of medicine and law in the vast majority of educational institutions in America. Four years is the regular course throughout America today, with very few exceptions, and it would be interesting to know the name of the head of any engineering school of any standing who would prefer a six-year course to the present four-year course.

The reason why legal education is so vastly superior to engineering education is because legal education has been studied for some hundreds of years, whereas it is only in the last two generations that any serious study of engineering education has been made. The result is that the average engineering education is very superficial and utterly inadequate to meet the problems of actual engineering practice.

problems of actual engineering practice.

It is interesting to note that the senior engineering association in England does not accept an engineering degree as qualification for membership, but demands the equivalent of some form of apprenticeship. The heads of engineering schools will do well to keep out of any controversy on junior colleges and devote their energy to putting their own houses in order, and finding out why it is that technical graduates are so poorly paid, and finding out whether there is any connection between the quality of the technical education given our students and the low salaries given in the outside world.

The simplest reform would be to pass a rule that no instructor is promoted to the rank of an assistant professorship without at least five years practical experience intervening. Much of the deplorable atmosphere of our engineering colleges would be thereby automatically eliminated.

Finally, the reference to engineering schools of the first rank is interesting, because it is the impression that all engineering schools are equally unsatisfactory, and that the leading ones of a generation ago are no more satisfactory than those less well known.

S. M. UDALE.

Holley Carburetor Co., Detroit.

Making of Wire Illustrated

The making of wire was told by means of motion pictures at a large meeting at the Engineering Societies Building, New York, March 17, under the auspices of the Bethlehem Steel Co., with John M. Ellis, manager of sales for New York, in charge. The lecture was delivered by George A. Richardson, of the Bethlehem company. The steps in the process included the making of steel by both the Bessemer and open-hearth processes and carried the fashioning of the steel from the ingot through continuous wire rod mills and showed methods of wire drawing and the making of nails. Motion pictures from airplanes showed the extent of the Sparrows Point plant of the company and its strategic position with respect to water transportation for both the receipt of materials and the delivery of products. The pictures also showed the manufacture of sheet bars in continuous mills and in general indicated how the new Sparrows Point plants represent some notable departures from recent modern methods and equipment.

Canadian Automobile Production

February production of automobiles in Canada, as reported by the Dominion Bureau of Statistics, was as follows: Passenger cars, 14,826; trucks, 3829. This compares with production in January of 11,745 passenger cars and 3631 trucks, and production in February, 1926, of 14,761 passenger cars and 4077 trucks.

Iron and Steel Markets

Gives Little Heed to Coal Strike

Steel Trade Producing and Shipping at High Rate in Excess of Bookings—Demand Not Yet Expanding—

Contracting of Coke at Reduced Prices

PRODUCTION of steel remains at a high level. In large part it is going directly into consumption. Only here and there are any buyers stocking, and the impending coal strike is still a minor factor.

Shipments continue to exceed bookings, with the margin smallest in the Chicago district. General demand is not expanding, and backlogs of mill orders so far this month show reductions equal to those of the same period of February.

Price concessions have not disappeared. They occur particularly in sheets, which show production in the last two months 8 per cent above both sales and shipments. A marked increase in demand for automobile body sheets is offset by only moderate activity in the commoner grades, and the latter with 35 makers actively seeking business naturally exhibit irregularities.

Some second quarter covering of bars, plates and sheets is in part the result of urging to prepare against coal strike eventualities. Not much bar tonnage will be carried over from the present quarter, as contract buying was not heavy. Mills are not a unit on commitments for the full period, a number waiting to gage the effect of the strike, yet bars have been sold at 1.80c., Pittsburgh basis, as have some large lots of plates, or \$2 below the general quotation.

Four more blast furnaces are in blast in the broad Pittsburgh region than on March 1, the latest additions being a stack of the Pittsburgh Steel Co. and a Bethlehem furnace at Johnstown.

Tractor and threshing machinery builders are busy, and including other agricultural machinery makers, the farm implement industry generally is on a 70 per cent manufacturing basis. The textile industry is taking cold finished steel in good volume, balancing spare buying from the oil industry and steel jobbers; the result is that the increasing demand from automobile plants puts the cold finished steel business on its level of a year ago.

Rail mills are operating at an 85 per cent rate, but within a few weeks several contracts will be completed. Production of spikes, bolts and angle bars averages about 60 per cent and tie plates about 85 per cent. Orders for track accessories are being quietly placed in round lots.

Railroad orders include 300 automobile cars for the Denver & Rio Grande Western and 200 ballast cars for the Northern Pacific. The H. C. Frick Coke Co. contracted for 1254 mine cars. The Pennsylvania Railroad will take bids March 30 on about 25,000 tons of finished steel for second quarter. The largest items are 15,000 tons of plates and 5500 tons of bars. The Chesapeake & Ohio has asked for prices on 3000 tons of plates, shapes and bars.

Included in 80,000 tons of structural steel work

under most active negotiation is a 20-story warehouse, covering three city blocks in Chicago, which will take 40,000 tons. A newspaper building in Chicago will require 11,000 tons. Orders of the past week call for 28,500 tons. For some time fabricated steel bookings have been swelled by numerous unusually large projects, with the result that the smaller fabricators find it difficult to run their shops beyond a 25 to 35 per cent rate, though larger ones are at 60 per cent.

An advance of \$9 a ton in the base price of large rivets is fairly general, but reduced extras of the new price lists mean a net reduction in some instances. Cap and set screws have been reduced 5 per cent or more.

Compared with blue sheets, buying of black and galvanized sheets is relatively light. In the East 3.65c., Pittsburgh, has again been done on the galvanized product, and 2.65c. and 2.70c. on steel barrel stock, though 2.75c. to 2.80c. is the common range on black sheets.

Tin plate mills have dropped only to a 90 per cent operating rate, but many are rolling against May quotas.

Expectations of further advances in Valley pig iron have passed with fresh weakness in coke. Contracts for furnace coke for the second quarter, covering about 70,000 tons a month, have been placed at 35c. to 50c. a ton below recent asking prices. In most other districts pig iron buying is on a diminishing scale, although sales at Cleveland, at 35,000 tons, exceeded the previous week by 5000 tons. In Michigan considerable iron is being bought by the automotive industry. Changes in price have been few and the tendency is toward greater firmness. Alabama furnaces have opened their books on foundry iron for the second quarter at \$18, base Birmingham, the price that has ruled for some time. At Chicago a merchant furnace has been blown in.

March deliveries of Indian iron at San Francisco and Los Angeles will total about 5000 tons, but foreign iron is not figuring prominently along the Eastern seaboard. A 2200-ton shipment of low phosphorus iron, however, the first to come from England since the British coal strike, will reach Philadelphia next week after the higher pig iron duty goes into effect.

Following the activity in the Pittsburgh scrap market, heavy melting steel has advanced 50c. a ton at Cleveland and 25c. at Chicago on consumer purchases. At Cincinnati also that grade is 50c. higher.

THE IRON AGE composite prices are unchanged from last week, that for pig iron remaining at \$19.04 per gross ton, and that for finished steel at 2.367c. per lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton: 1927 1927 1927 1926 No. 2, fdy., Philadelphia. \$21.76 \$22.76 \$22.76 No. 2, Valley furnace. 18.50 18.50 18.50 20.50 No. 2, Southern, Cin'ti. 21.69 21.69 21.69 25.69 No. 2, Birmingham. 18.00 18.00 18.00 22.00 No. 2 foundry, Chicago* 20.00 20.00 20.00 23.00 Basic, del'd eastern Pa. 20.75 20.75 21.00 21.75 Basic, Valley furnace. 18.50 18.50 18.00 20.00 Valley Bessemer, del. P'gh 21.26 21.26 20.76 22.76	Per Lb. to Large Buyers: Cents Cents Cents Cents Cents Sheets, black, No. 24, Pigh 2.75 2.75 2.75 3.10 Sheets, black, No. 24, Chicago dist. mill 2.95 2.95 2.90 3.30 Sheets, galv., No. 24, Pigh 3.65 3.65 3.65 4.05 Sheets, galv., No. 24, Chicago dist. mill 3.85 3.85 3.85 4.25 Sheets, blue, 9 & 10, Pigh 2.20 2.20 2.20 2.50 Sheets, blue, 9 & 10, Chicago dist. mill 2.85 2.30 2.30 2.60	
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Malleable, Valley 18.50 18.50 20.50	Wire nails, Pittsburgh 2.55 2.55 2.55 Wire nails, Chicago dist.	
Gray forge, Pittsburgh 19.76 19.76 19.76 21.76	mill 2.60 2.60 2.60 2.70	
L. S. charcoal, Chicago 27.04 27.04 27.04 29.04	Plain wire, Pittsburgh 2.40 2.40 2.40 2.50	
Ferromanganese, furnace100.00 100.00 100.00 90.00	Plain wire. Chicago dist.	
Daile Dillete etc n e	mill 2.45 2.45 2.45 2.55	
Rails, Billets, etc., Per Gross Ton:	Barbed wire, galv., P'gh. 3.25 3.25 3.25 3.35	
Oh. rails, heavy, at mill. \$43.00 \$43.00 \$43.00	Barbed wire, galv., Chicago dist. mill 3.30 3.30 3.40	
Light rails at mill 36.00 36.00 36.00 35.00	Tin plate, 100 lb. box, P'gh \$5.50 \$5.50 \$5.50 \$5.50	
Bess. billets, Pittsburgh 34.00 34.00 33.00 35.00	In plate, 100 to. box, 1 gir 40.00 40.00 40.00	
Oh. billets, Pittsburgh 34.00 34.00 33.00 35.00	Old Material, Per Gross Ton:	
Oh. sheet bars, P'gh 34.00 34.00 34.00 36.00	Carwheels, Chicago\$15.00 \$15.00 \$15.00 \$17.00	
Forging billets, P'gh 40.00 40.00 40.00 40.00	Carwheels, Philadelphia . 16.00 16.00 17.50	
Oh. billets, Phila 39-30 38.30 38.30 40.30	Heavy melting steel, P'gh. 16.75 16.75 16.00 17.50	
Wire rods, Pittsburgh 43.00 43.00 43.00 45.00	Heavy melting steel, Phila. 14.50 14.50 14.50 16.50	
Cents Cents Cents Cents	Heavy melting steel, Ch'go 13.00 12.75 12.75 14.00 No. 1 cast, Pittsburgh 16.00 16.00 15.75 17.00	
Skelp, grvd. steel, P'gh, lb. 1.90 1.90 1.90 1.90	No. 1 cast, Philadelphia 17.00 17.00 17.00 17.50	
Finished Iron and Steel,	No. 1 cast. Ch'go (net ton) 16.50 16.50 16.50 17.00 No. 1 RR. wrot. Phila 17.00 17.00 17.00 17.00	
Per Lb. to Large Buyers: Cents Cents Cents Cents	No. 1 RR. wrot. Ch'go (net) 12.00 12.00 12.00 13.00	
Iron bars, Philadelphia 2.12 2.12 2.12 2.22	Cala Camallanilla	
Iron bars, Chicago 2.00 2.00 2.00 2.00	Coke, Connellsville,	
Steel bars, Pittsburgh 1.90 1.90 1.90 2.00	Per Net Ton at Oven:	
Steel bars, Chicago 2.00 2.00 2.00 2.10	Furnace coke, prompt \$3.25 \$3.25 \$3.50 \$3.00	
Steel bars, New York 2.24 2.24 2.24 2.34	Foundry coke, prompt 4.25 4.50 4.50 4.25	
Tank plates, Pittsburgh 1.85 1.85 1.85 1.85		
Tank plates, Chicago 2.00 2.00 2.00 2.10	Metals,	
Tank plates, New York 2.19 2.19 2.19 2.14	Per Lb. to Large Buyers: Cents Cents Cents Cents	
Beams, Pittsburgh 1.90 1.90 1.90 1.90	Lake copper, New York. 13.50 13.50 13.12 14.25	
Beams, Chicago 2.00 2.00 2.00 2.10	Electrolytic copper, refinery 13.12 13.12 12.75 13.87 1	6
Beams, New York 2.19 2.19 2.19 2.24	Zinc, St. Louis 6.65 6.75 6.85 7.42 4	6
Steel hoops, Pittsburgh 2.30 2.30 2.20 2.50	Zinc, New York 7.00 7.10 7.20 7.774	6
2.20 2.30	Lead, St. Louis 7.30 7.40 7.30 8.10	
*The average switching charge for delivery to foundries in the Chicago district is 61c, per ton.	Lead, New York	Di

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Two More Steel Works Furnaces Blown In-Build Reserves of Pig Iron and Steel As Strike Precaution

PITTSBURGH, March 22.—The steel market is holding its recent rate of activity. While here and there is some evidence that the impending coal strike is causing buyers to make preparations in the way of a little extra stock, the general demand is not expanding. If there has been any material change in the rate of plant operations in the past week, it has been upward, but this may be ascribed to a desire to have either pig iron or semi-finished steel in reserve in the event that the coal strike assumes the serious aspects that are feared in some quarters.

The Pittsburgh Steel Co. has put on a blast furnace since a week ago, and an additional furnace also is producing at Cambria Works, Bethlehem Steel Co., Johnstown, Pa. With the two furnaces recently started by Carnegie Steel Co., there are now four more furnaces in production in this and nearby districts than at the beginning of the month, and the stack of the Sharpsville Furnace Co., Sharpsville, Pa., idle since the first of the year, is expected to start up on or about April 1. Of the 126 furnaces in western Pennsylvania, eastern Ohio and the Wheeling district, 83 now are producing, with the Carnegie Steel Co. having 36 out of 51 in blast. The actual output of iron is exceeding the percentage of stacks active and may be estimated at more than 70 per cent, against about 67 per cent on

a numerical basis. Ingot production for the same area is easily 85 per cent of capacity.

While a steady increase is noted in the demand for steel from the automotive industry, the oil and gas industry is buying tankage and line pipe freely. ness in casing and other kinds of well pipe is affected by the oversupply of oil, and there seems to be more conservatism among the railroads in the matter of steel purchases than was the case at the opening of the year. The apparent satisfaction over the demand from the automotive industry is tempered by the fact that two of the largest users of steel in that business are running so low that the total of the orders is below what it might be.

There is no occasion to change prices, and broadly they are no stronger than they have been. Competition for black sheet orders is still sharp at the expense of prices, and steadiness in blue annealed sheets at 2.20c. may possibly be due to the fact that at that price they are much cheaper than light plates, figuring the latter at 1.90c., base. Ordinary tonnages of bars still bring 1.90c. in the Pittsburgh district, but in central local mills are encountering 1.80c., Cleveland, and 1.90c. is not easily obtained in the East.

Stiff advances have been made in new price lists

and extras announced March 21 by leading producers of rivets. A few small sizes will be cheaper than they were, but the cost to consumers has been increased by \$1 to \$12 per ton in other sizes.

The effort to advance pig iron prices in this market seems to have been balked by the developments of the week in the coke market. The requirements of five or six furnaces for the second quarter, amounting to about 70,000 tons a month, were placed in the past week, and while some of the business was at \$3.65 per net ton at ovens, more of it was at \$3.50. This compares with recent asking prices of \$4 to \$4.25. That the market should weaken in the face of this activity and the possibility that the strike of the union miners may extend to the non-union districts, can be explained by the fact that the few producers who shared in the business evidently figured that without a backlog of orders and work to offer they would have little success in holding their men if union pressure became strong in the Connellsville district. Another and stronger reason is that pig iron producers would not pay the prices asked.

A contract for 20,060 tons of coking coal a month to run for a year, taken at well under \$2 per ton, is another bit of evidence of a desire for backlog business to provide the work that will keep the men satisfied. An interesting angle of the coal situation is the departure of union miners to non-union districts. Whether they are starting to be on the spot when the union mines suspend and the non-union mines will need more men or are going to help disturb conditions in the open-shop mines is a matter of conjecture. Generally, however, there is less of a tendency to dismiss

the strike possibilities lightly.

Pig Iron.—With coke prices for second quarter tonnages 35c. to 50c. per ton lower than they were expected to be, one of the arguments for further advances in pig iron prices is removed. A paucity of offerings rather than a big demand made possible the recent advances in the steel-making grades, but this temporary shortage failed to develop in foundry iron and, with the demand limited at best, this grade did not go along with the others. Indeed, some doubt has crept in as to whether all producers were holding rigidly to \$18.50, Valley furnace, for No. 2 grade, or at least whether they were insisting on the full silicon differentials. Sales have been made at \$18.50, but that is all that can be obtained and higher quotations at present appear more of a hope than a pessibility. The Galion Iron Works, Galion, Ohio, is in the market for 1000 tons of No. 2 and No. 2X iron for second quarter delivery, but otherwise the inquiries run chiefly to one and two carloads.

Prices per gross ton f.o.b. Valley furnace:

	\$18.50
Bessemer	19.50
Gray forge\$18.00 to	18.50
No. 2 foundry 18.50 to	19.00
No. 3 foundry 18.00 to	
Malleable 18.50 to	
Low phosphorus, copper free	28.00

Freight rate to the Pittsburgh or Cleveland districts: \$1.76.

Ferroalloys.—Consumers of ferromanganese generally are too well covered to be interested in fresh supplies, and new business is confined to occasional carloads placed by those who usually buy in keeping with their requirements. This also is the situation in high grade ferrosilicon. Contract requirements are taking the full output of spiegeleisen, and spot offerings are very scant. Prices are unchanged on these alloys.

Fluorspar.—In spite of the high rate of steel works operations in this and nearby districts there is very

little demand for gravel fluorspar. Leading steel companies seem to have made ample preparation for their winter needs and apparently have not yet exhausted their stocks, while others are buying very close to their real needs. Prompt delivery is demanded on all current sales. There is much interest in the effort that is being made to have the import duty on foreign spar increased, although it is not expected that in the event the plea is granted it will result in higher prices for domestic material; rather the benefit to be derived is seen in a broadening of the domestic market, permitting fuller operation of domestic mines with the attendant lowering of costs. No change is noted in prices.

Semi-Finished Steel.—Open market activity does not amount to much, but there is a steady movement of billets, slabs and sheet bars under the arrangements between producers and non-integrated mills, which are made on a monthly basis as a rule but are elastic as to the right of the latter in extending the agreement. Mills commonly are quoting \$34, Pittsburgh or Youngstown, on billets, slabs and sheet bars, but no small part of the current shipments of billets and slabs carry \$33, the price to which the market fell in February. Forging quality steel remains at \$40, base Pittsburgh, and the ordinary tonnage price of wire rods is \$43, base Pittsburgh or Cleveland.

Steel and Iron Bars.—While there is an occasional quotation of 2c., base Pittsburgh, for small lots of bars, the ordinary tonnage market down to single carloads is best described as being no more than 1.90c., base. Urging by mills that buyers make some preparation against the possibilities of the impending coal strike has had some success, but an increase in the orders of local producers also can be traced to the steady expansion in automobile production. Normally early delivery can be had on almost all sizes of bars. Iron bars are dull and easy.

Structural Steel.—In this district and in the territory controlled through favorable freight rates, local mills are adhering to 1.90c., base Pittsburgh, on the ordinary day-to-day tonnages. But that price is not possible in the East, and individual projects involving big tonnages still get special price consideration. Structural shops in this district, although better engaged than they were at the outset of the year, still have capacity for more work.

Plates.—This product is making a very satisfactory showing in orders, due to the activity in large diameter pipe for gas lines and in oil storage tanks to take care of the present excess oil production. Barge business is steady, with 1600 tons in 10 barges placed locally in the past week. The ordinary tonnage price still is 1.90c., base Pittsburgh, with the tonnage lots going at 1.80c.

Wire Products.—The local situation is satisfactory as to demand and prices, but reports from other consuming centers indicate some price irregularity, due to efforts of several producing districts to maintain consuming connections.

Rails and Track Supplies. — Current business in track accessories is sluggish, but there is a fair amount

THE IRON AGE Composite Prices

Finished Steel March 22, 1927, 2.367c. a Lb.

One	week ago			.367c.
One	month ago.			.367c.
One	year ago			.431c.
10	OOM DING THOM	0 210 00	1	0000

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low		
1926 - 2. 1925 - 2. 1924 - 2.	453c., 560c., 789c.,	Ian. 4 Ian. 5 Ian. 6 Ian. 15 pril 24	 2.367c., 2.403c., 2.396c., 2.460c., 2.446c.,		Feb. 21 May 18 Aug. 18 Oct. 14 Jan. 2

Pig Iron March 22, 1927, \$19.04 a Gross Ton

One	week	ago				*				,		*	*				×		*	\$19.04
One	month	ago.									*									18.96
	year a																			
10-y	ear pr	e-war	8	1.5	re	r	ag	ge	١.							0		0		15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	Hig	h	Lo	W
1927	\$19.71,	Jan. 4;	\$18.96,	Feb. 15
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	March 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars Soft Steel	Sheets Blue Annealed	Track Equipment (F.o.b. Mill)
Base Per Lb.	Base Per Lb.	Base Per 100 Lb.
F.o.b. Chicago	Nos. 9 and 10, f.o.b. Pittsburgh2.20c. to 2.25c. Nos. 9 and 10, f.o.b. Ohio mill2.20c. to 2.25c.	Spikes, % in. and larger\$2.80 to \$3.00 Spikes, % in. and smaller 2.90 to \$.25 Spikes, boat and barge
Del'd Philadelphia	Nos. 9 and 10, f.o.b. Chicago dist. mill	Spikes, boat and barge 3.25
Del'd New York	Nos. 9 and 10, del'd Philadelphia 2.52c. to 2.57c.	Track bolts, all sizes 3.90 to 4.50 Tie plates, steel 2.38
Foh Cleveland 190c	Nos. 9 and 10, f.o.b. Birmingham 2.35c. to 2.45c.	Angle bars 2.78
F.o.b. Birmingham	Box Annealed, One Pass Cold Rolled	
F.o.b. San Francisco mills2.35c. to 2.40c.	No. 24, f.o.b. Pittsburgh2.75e. to 2.90e.	Welded Pipe
Billet Steel Reinforcing	No. 24, f.o.b. Ohio mill	Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh mills1.90c.	No. 24, f.o.b. Ch'go dist. mill2.95c. to 3.05c. No. 24, del'd Philadelphia3.07c. to 3.17c.	Butt Weld
Rail Steel	No. 24, f.o.b. Birmingham3.00c. to 3.10c.	MACON I
F.o.b. mill	Metal Furniture Sheets	Inches Black Galv. Inches Black Galv.
F.o.b. Chicago	No. 24, f.o.b. Pittsburgh, A grade. 3.90c. to 4.05c.	14 to 36 51 25 1/2 1/2 22 2
Iron	No. 24, f.o.b. Pittsburgh, B grade. 3.75c. to 3.95c.	56 42½ ¾ 28 11 % 60 48½ 1 to 116 30 18
Common iron, f.o.b. Chicago2.00c.	Galvanized	Inches Black Galv.
Refined iron, f.o.b. P'gh mills2.75c. Common iron, del'd Philadelphia2.12c. to 2.22c.	No. 24, f.o.b. Pittsburgh3.65c. to 3.75c.	Lap Weld
Common iron, del'd New York2.14c. to 2.24c.	No. 24, f.o.b. Ohio mill	2 55 431/2 28 7
Tank Plates	No. 24, del'd Philadelphia4.02c. to 4.07c. No. 24, f.o.b. Birmingham3.90c. to 4.00c.	2 55 48\frac{1}{2} 2 28 7 2\frac{1}{2} \text{ to 6.} 59 47\frac{1}{2} 2\frac{1}{2} 26 11 7 and 8 56 43\frac{1}{2} 3 to 6 28 13 9 and 10 54 41\frac{1}{2} 11 and 12. 53 40\frac{1}{2} 1
Base Per Lb.		9 and 10. 54 411/2 7 to 12 26 11
F.o.b. Pittsburgh mill1.80c. to 1.90c.	Tin Mill Black Plate	
F.o.b. Chicago	No. 28, f.o.b. Pittsburgh3.05c. to 3.10c. No. 28, f.o.b. Chicago dist. mill3.10c. to 3.20c.	Butt Weld, extra strong, plain ends
Del'd Cleveland	Automobile Body Sheets	16 41 241/4 to %+19 +54 16 to % 47 301/4 to 21 17
Del'd New York	No. 20, f.o.b. Pittsburgh4.15c.	29 58 42 4 4 28 12
C.i.f. Pacific ports2.25c. to 2.30c.		$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Structural Shapes	Long Ternes No. 24, 8-lb. coating. f.o.b. mill4.10c. to 4.30c.	2 to \$ 61 50 ½
Base Per Lb.	No. 24, 6-10. Coating. 1.0.0. mill4.10c. to 4.00c.	Lap Weld, extra strong, plain ends
F.o.b. Pittsburgh mills	Tin Plate	
F.o.b. Birmingham2.05c. to 2.15c.	Per Base Box	2 1/2 to 4. 57 46 1/2 21/2 to 4. 29 15 41/2 to 6. 56 45 1/4 1/2 to 6. 28 14 7 to 8 52 39 1/2 7 to 8 21 15 9 and 10. 45 32 1/2 11 and 12. 44 31 1/2
Del'd Cleveland	Standard cokes, f.o.b. P'gh district mills\$5.50 Standard cokes, f.o.b. Gary and Elwood, Ind. 5.69	7 to 8 52 89 7 to 8 21 15 9 and 10 45 32 9 to 12 16 2
Del'd New York	m DI-4-	9 and 10 45 32½ 9 to 12 16 3 11 and 12. 44 31½
	Terne Plate	To the large jobbing trade the above discounte
Hot-Rolled Flats (Hoops, Bands and	(F.o.b. Morgantown or Pittsburgh) (Per package, 20 x 28 in.)	on steel pipe are increased on black by one point, with supplementary discount of 5%, and
Strips) Base Per Lb.	8-lb. coating, 100 20-lb. coating I.C.\$16.20	on galvanized by 11/2 points, with supplementary
All gages, narrower than 6 in., P'gh2.30c.	lb. base\$11.40 25-lb. coating I.C. 17.90	on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to
All gages, 6 in to 12 in., P'gh*2.10c. All gages, narrower than 6 in., Chicago,	lb, base\$11.40 25-lb, coating I.C. 17.90 8-lb, coating I.C 11.70 80-lb, coating I.C. 19.45 15-lb, coating I.C. 14.85 40-lb, coating I.C. 21.65	large jobbers by one point with supplementary discounts of 5 and 2\%%.
2.40c. to 2.60c.	The second secon	NoteChicago district mills have a base two
All gages, 6 in. and wider, Chicago, 2.30c. to 2.50c.	Alloy Steel Bars	points less than the above discounts. Chicago delivered base is 21/2 points less. Freight is
*Mills follow plate or sheet prices according	S. A. E. (F.o.b. Pittsburgh or Chicago)	ngured from Pittsburgh, Lorain, Ohio, and Chi-
to gage on wider than 12 in.	Series	cago district mills, the billing being from the point producing the lowest price to destination.
Cold-Finished Steel	Numbers Base Per 100 Lb. 2100* (½% Nickel, 0.10% to 0.20%	
Base Per Lb.	Carbon)\$3.00 to \$3.15	Boiler Tubes
Bars, f.o.b. Pittsburgh mills	2300 (8 ¹ / ₄ % Nickel)	Base Discounts, f.o.b. Pittsburgh
Bars, f.o.b. Chicago	2500 (5% Nickel)	Lap Welded Steel Charcoal Iron
Shafting, ground, f.o.b. mill 2.55c. to 3.00c.	3300 (Nickel Chromium) 7.00 to 7.25	2 to 2½ in 27 2½ to 2½ in 37 3 in 40 2½ to 3¾ in 42½ 4 to 13 in 46 3¼ to 13 in 46 3¼ to 4½ in 27 4 to 13 in 46
Strips, f.o.b. Pittsburgh mills	3400 (Nickel Chromium) 6.25 to 6.50 5100 (Chromium Steel) 3.30 to 3.40	81/4 to 33/4 in 421/4 21/4 to 3 in 7
Strips, delivered Chicago3.80c. to 3.55c.	5200* (Chromium Steel) 7.00 to 7.50 6100 (Chrom. Vanadium bars) 4.20 to 4.30	Beyond the above discounts, 5 to 7 fives extra
*According to size.	6100 (Chrom. Vanad. spring steel) 3.80	are given on lap welded steel tubes and 2 tens
Wire Products	Stop	to 2 tens and 1 five on charcoal iron tubes.
(To jobbers in car lots, f.o.b. Pittsburgh and	Carbon Vanadium (0.45% to 0.55%	Standard Commercial Seamless Boiler
Cleveland)	Carbon, 0.15% Vanad.) 4.10 to 4.20 Nickel Chrome Vanadium (0.60	Tubes
Wire nails\$2.55	Nickel, 0.50 Chrom., 0.15 Vanad.) 4.20 to 4.30	Cold Drawn
Galv'd nails, 1-in, and longer 4.55	Chromium Molybdenum bars (0.80— 1.10 Chrom., 0.25—0.40 Molyb.) 4.25 to 4.35	1 in
Galv'd nails, shorter than 1-in	Chromium Molybdenum bars (0.50-	1½ to 1½ in 52 3½ to 3½ in 47 1¾ in 56 2 to 2½ in 50
Galvanized staples	0.70 Chrom., 0.15-0.25 Molyb.) 3.40 to 3.50	2 to 21/4 in 31 41/2, 5 and 6 in 45 21/4 to 23/4 in 39
Cement coated nails	Chromium Molybdenum spring steel (1-1.25 Chrom., 0.30-0.50	Hot Rolled
Bright plain wire, No. 9 gage\$2.40 Annealed fence wire	Molybdenum) 4.50 to 4.75	· Control of the cont
Spring wire 3.40	Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for	2 and 2½ in 37 3¼ and 3½ in 58 2½ and 2¾ in 45 4 in 56 3 in 51 4½, 5 and 6 in 51
Galv'd wire, No. 9	cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross	5 in 51 4½, 5 and 6 in 51
Barbed wire, painted 3.00	ton is the net price for bars of the same anal-	Less carloads, 4 points less. Add \$8 per ne ton for more than four gages heavier tha
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Bir-	vsis. For hillets under 4 x 4 in, down to and	ton for more than four gages heavier that standard. No extra for lengths up to and in cluding 24 ft. Sizes smaller than 1 in an
mingham mill prices \$3 a ton higher; Worcester,		lighter than standard gave to be held at me
	ton moore and a manage grant	topical comments a garge or the recta are and
Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher;	*Not S. A. E. specification, but numbered by	cluding 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at machanical tubes list and discount. Intermediatives and gages not listed take price of next
Mass., mill \$3 a ton higher on production of		chanical tubes list and discount. Intermediat sizes and gages not listed take price of nex larger outside diameter and heavier gage.

Woven Wire Fence

Per Cent Of List

Seamless Mechanical Tubing

Per Gross Ton

of second quarter inquiry. Under the revision of bolt prices, track bolts after April 1, will be quoted on a piece instead of a pound basis and subject to the common discount of 70 per cent from the list prices. Light-section rails find a fair sale in small lots at unchanged prices.

Tubular Goods.—A Youngstown producer will furnish 160 miles of 12¾-in. plain-end line pipe for a gas line for the Rio Grande Valley Gas Co., the line to run from Jim Hogg and Webb counties, Texas, to Brownsville. This line came up for bids last fall, but formal closing of the order appears to have been delayed for the completion of financing. Makers generally are well provided with line-pipe orders running 10 in. and larger, but they have not yet experienced the usual spring demand for well pipe. That is not hard to understand in view of the fact that oil production is running about 2,500,000 bbl. weekly, against requirements of about 2,000,000 bbl. There is less than the usual expansion in the demand for standard-weight pipe. Demand for boiler tubes still leaves much to be desired. Discounts are given on page 887.

Sheets. - Some quickening in demand and an increase in sheet mill operations, which now average more than 80 per cent of capacity, are due in no small degree to fear as to the possibilities of the impending coal miners' strike. In the case of automobile body sheets alone does there seem to be genuine basis for larger demands. Mills making this grade are doing well, but it is admitted that full engagement of capacity is not demanded by the orders, due to the low rate of production of two of the largest producers of moderate and low-priced cars. Prices are neither better nor worse from the manufacturers' standpoint than they have been. Blue annealed sheets are the steadiest, with galvanized making the next best showing. latter still are selling, notably in the East, at 3.65c., base Pittsburgh. With 35 makers seeking a share of black sheet business, prices naturally favor buyers. Tin mill black plate is held a little more firmly, and generally 3.05c., base, (No. 28 gage) is as low as is now quoted.

Tin Plate.—Mill operations are beginning to slip a little, notably on the part of the leading producing company, which no longer is running 17 turns. The average now is not over 90 per cent of capacity, and in going that well, it is necessary for many of the mills to roll against May contract quotas. Because of the efforts being made to correct the over-supply of some of the canned vegetables through curtailment of planting and packing, it begins to look as if a drop in tin plate production would not result in any shortage later in the packing season, especially as it is now evident that there has been some anticipation of rolling and finishing.

Cold-Finished Steel Bars and Shafting.—A low rate of production by two companies making popular-priced automobiles on a quantity basis appears to be fairly well counterbalanced by increased output by other makers. The demand for cold-finished steel bars, accordingly, is not materially smaller than it was a year ago. Fairly good demand is reported from the textile and agricultural machinery manufacturers, but the oil industry and the jobbers are rather sparing buyers. The market is holding well at 2.40c., base Pittsburgh, for the ordinary run of orders.

Warehouse Prices, f.o.b. Pittsburgh

to me and a control of control of the control of th
Base per Lb.
Plates 3.00c.
Structural shapes 3.00c.
Soft steel bars and small shapes 2.90c.
Reinforcing steel bars 2.75c.
Cold-finished shafting and screw stock-
Rounds and hexagons 3.60c.
Squares and flats 4.10c.
Bands 3.60c.
Hoops
Black sheets (No. 24 gage), 25 or more
bundles 3.75c.
Galvanized sheets (No. 24 gage), 25 or
more bundles 4.50c.
Blue annealed sheets (No. 10 gage), 25 or
more sheets 3.30c.
Small3.80c. to 5.25c.
Boat 3.80c.
Track bolts62 1/2 per cent off list
Large rivets, base per 100 lb \$3.50
Wire, black soft annealed, base per 100 lb 12.90
Wire, black soft annealed, base per 100 lb. 2.90
Common wire nails, per keg 2.90
Cement coated nails, per keg 2.95

Hot-Rolled Flats.—New business does not amount to much, but that is rather to be expected in view of the liberal coverage extended buyers before prices were advanced a few weeks ago. Specifications are coming along well. There is no evidence of deviations from 2.10c., base Pittsburgh, on material 6 in. to 12 in. wide, or from 2.30c., for narrow stock, on such business as is developing.

Cold-Rolled Strips. — The automotive industry is specifying well against contracts entered at lower prices than are now quoted. Protection was liberally extended prior to the recent advance, and there is hardly enough business to provide a real test of the new prices. Mills commonly are quoting 3c., base Pittsburgh, for carloads and from 3.10c. to 3.25c., base, for smaller tonnages.

Old Material.—The scrap market has wavered a little in the past week, because consumers have not entered the market as they have been expected to and dealers are a little more anxious for orders. On heavy melting steel, \$17 is as low as the dealers want to go, but it is difficult to get melters to meet that price and \$16 is all that at least two steel makers in the district will bid. On the basis of what might be done, the latter price is probably too low, although dealers claim to be able to buy at that figure for delivery at one consuming point. The recent sale into consumption at \$17.50. however, acts as a sustaining influence, because good heavy melting steel is not offered freely and dealers who sold are not letting themselves get into a tight place in the completion of the order. Recent sales of railroad specialties at \$19 are not easily repeated. Efforts to stiffen prices of the blast furnace grades suffer for want of consumer interest.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Gr	ades:	
Heavy melting steel	16.50 to	\$17.00
Scrap rails	16.00 to	16.50
Compressed sheet steel	15.50 to	16.00
Bundled sheets, sides and ends	14.50 to	15.00
Cast iron carwheels	16.00 to	16.50
Sheet bar crops, ordinary	16.50 to	17.00
Heavy breakable cast	15.50 to	16.00
No. 2 railroad wrought	16.50 to	17.00
Heavy steel axle turnings	14.50 to	15.00
Machine shop turnings	12.00 to	12.25
Acid Open-Hearth Furnace G		
Railroad knuckles and couplers	18.50 to	19.00
Railroad coil and leaf springs	18.50 to	19.00
Rolled steel wheels	18.50 to	19.00
Low phosphorus billet and bloom		
ends	20.50 to	21.00
Low phosphorus mill plate	20.00 to	20.50
Low phosphorus, light grade	18.00 to	18.50
Low phosphorus sheet bar crops.	18,00 to	18.50
Heavy steel axle turnings	14.50 to	15.00
Electric Furnace Grades:	2 2100 00	20100
Low phosphorus punchings	18.50 to	19.00
Heavy steel axle turnings		15.00
Blast Furnace Grades:		
Short shoveling steel turnings		12.50
Short mixed borings and turnings		12.50
Cast iron borings		12.50
No. 2 busheling		12.50
Rolling Mill Grades:		
Steel car axles	21.50 to	22.00
No. 1 railroad wrought	13.00 to	
Cupola Grades:	20120 00	20100
No. 1 cast	16.00 to	16.50
Rails, 3 ft. and under	19.50 to	
Malleable Grades:		
Railroad	16.50 to	17.00
Industrial		
Agricultural	15.50 to	

Coke and Coal.—The market has weakened instead of strengthened with the approach of April 1, when union mines are expected to shut down or to be operated without recognition of the union. Several second quarter contracts for furnace coke have been closed in the past week at \$3.50 to \$3.65 per net ton at ovens, and for spot or April delivery the market is no longer quotable at more than \$3.25. Foundry coke also is off, with good brands readily obtainable at \$4.25 to \$4.70, while the coal market has lost such firmness as it recently showed. In coal transactions, the outstanding one is a contract for a year calling for 20,000 tons a month. The buyer, a Valley merchant furnace interest with coking ovens near its furnace, did not pay more than \$1.90 per net ton at mines.

Bolts, Nuts and Rivets.—Rivets since a week ago have come in for price revision, leading manufacturers having announced, effective April 1, a base of \$2.75 per 100 lb., f.o.b. Pittsburgh or Cleveland, and of \$2.85, f.o.b. Chicago, on large rivets. That price compares

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mi	11 Prices of Semi-Finished Stee F.o.b. Pittsburgh or Youngstown	
Billets and Blooms	Slabs	Wire Pede
Reroiling, 4-in. and over \$34.00 Rerolling, under 4-in. to and including 1%-in	8 in. x 2 in, and larger \$34.00 Smaller than 8 in. x 2 in\$84.50 to 35.00	Wire Rods Per Gross Ton *Common soft, base
Forging, ordinary	Skelp Per Lb.	Carbon 0.56% to 0.75% 7.50 per ton over base Carbon over 0.75% 10.00 per ton over base
Sheet Bars Per Gross Ton Open-hearth or Bessemer\$34.00	Grooved 1.90c. Sheared 1.90c. Universal 1.90c.	*Chicago mill base is \$44. Cleveland mill base, \$43.
	Prices of Raw Materials	The state of the s
Ores	Ferromanganese	Fluxes and Refractories
Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton Domestic, 80%, furnace or seab'd\$100.00	Fluorspar Per Net Ton
Per Gross Ton Old range Bessemer, 51.50% iron \$4.55 Old range non-Bessemer, 51.50% iron 4.40 Mesabi Bessemer, 51.50% iron 4.40 Mesabi non-Bessemer, 51.50% iron 4.25 High phosphorus, 51.50% iron 4.15	Foreign, 80%, Atlantic or Gulf port, duty paid	Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines\$18.00 No. 2 lump, Illinois and Kentucky mines\$20.00
Foreign Ore, c.i.f. Philadelphia or Baltimore Per Unit	Domestic, 19 to 21%	Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid,
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria,	Electric Ferrosilicon Per Gross Ton Delivered	\$17.00 to \$17.50 Domestic, No. 1 ground bulk, 95 to 98%
10.00c. to 10.50c. iron, 9.50c. to 10.00c.	50%	calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines\$32.50
Manganese ore, washed, 52% manganese, from the Caucasus	Furnace Furnace 10%\$35.00 12%\$39.00 11%\$37.00 14 to 16%.\$45 to 46.00	Fire Clay Per 1000 f.o.b. Works
basis 50%	11% 37.00 14 to 16% \$45 to 46.00	High Duty Moderate Duty
concentrates\$12.00 to \$13.50	Bessemer Ferrosilicon	Pennsylvania\$40.00 to \$43.00 \$38.00 to \$40.00 Maryland 43.00 to 46.00 \$8.00 to 40.00
Chrome ore, Indian basic, 48% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard\$22.50	F.o.b. Jackson County, Ohio, Furnace Per Gross Ton Per Gross Ton	New Jersey 55.00 to 75.00 Ohio 40.00 to 43.00 38.00 to 40.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered50c. to 55c.	11% 36.00	Kentucky 40.00 to 43.00 38.00 to 40.00 Illinois 40.00 to 43.00 35.00 to 38.00
Coke -	Silvery Iron F.o.b. Jackson County, Ohio, Furnace	Missouri 40.00 to 43.00 35.00 to 38.00 Ground fire clay, per ton 6.50 to 7.50
Furnace, f.o.b. Connellsville	Per Gross Ton Per Gross Ton \$26.50 10%\$32.00	Ground are clay, per ton 6.50 to 7.50
prompt \$3.25 Foundry, f.o.b. Connellsville prompt \$4.25 to 4.50	7% 27.50 11% 34.00 8% 28.50 12% 36.0°.	Silica Brick Per 1000 f.o.b. Works
Foundry, by-product, Ch'go ovens 9.75 Foundry, by-product, New Eng-	9% 30.00	Pennsylvania\$40.00
land, del'd	Other Ferroalloys Ferrotungsten, per lb. contained metal,	Chicago
Jersey City, delivered 9.59 to 10.77 Foundry, Birmingham 5.50 to 6.00 Foundry, hy-product, St. Louis 10.50	del'd \$1.08 to \$1.10 Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. deliv-	Silica clay, per ton\$8.00 to 9.00 Magnesite Brick
Coal	ered, in carloads	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	f.o.b. furnace \$3.25 to \$4.00 Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads\$200.00 Ferrophosphorus, electric or blast furnace	Standard sizes, f.o.b. Baltimore and Chester, Pa
mines	material, in carloads, 18%, Rockdale, Tenn., base, per net ton	Chrome Brick
Steam slack, f.o.b. W. Pa. mines 1.45 to 1.50 Gas slack, f.o.b. W. Pa. mines 1.50 to 1.60	Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton\$122.50	Standard size
Mill Pric	es of Bolts, Nuts, Rivets and S	Set Screws
Bolts and Nuts	Bolts and Nuts	Large Rivets
(Less-than-Carload Lots) (F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)	(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)	Base per 100 Lb. F.o.b. Pittsburgh\$2.30 to \$2.40
Per Cent Off List Machine bolts, small, rolled threads60 and 10	Semi-finished hexagon nuts:	F.o.b. Chicago 2.60
Machine bolts, shall sizes, cut threads	% in. and smaller, U. S. S 80, 10, 10 and 5 % in. and larger, U. S. S 75, 10, 10 and 5 Small sizes, S. A. E 80, 10, 10, 10 and 5	Small Rivets Per Cent Off List
Carriage bolts, cut threads, all sizes50 and 10 Eagle carriage bolts	S. A. E., % in. and larger75, 10, 10, 10 and 5 Stove bolts in packages	F.o.b. Pittsburgh70, 10 and 5 to 70 and 10 F.o.b. Cleveland70, 10 and 5 to 70 and 10 F.o.b. Chicago70, 10 and 5 to 70 and 10
Larger and longer sizes45, 10 and 5	Semi-Finished Castellated and Slotted	Cap and Set Screws
Bolt ends with hot-pressed nuts50, 10 and 10 Bolt ends with cold-pressed nuts45, 10 and 5 Hot-pressed nuts, blank and tapped, square,	Nuts (Actual freight allowed up to but not exceeding 50c. per 100 lb.)	(Freight allowed up to but not exceeding 50c. per 100 lb.)
4.00c. per lb. off list Hot-pressed nuts, blank or tapped, hexagons,	(To jobbers and consumers in large quantities)	Per Cent Off List
C.p.c. and t. square or hex. nuts, blank or tapped	Per 100 Net S.A.E. U.S.S. \$3.4E. U.S.S. \$4.4in\$0.44 \$0.44 \$4.4in\$2.35 \$2.40	Milled cap screws
Washers*6.75c. to 6.50c. per lb. off list *F.o.b. Chicago and Pittsburgh.	¼-in. \$0.44 \$0.44 ¾-in. \$2.35 \$2.40 ½-in. 0.515 0.515 ½-in. 3.60 3.60 ¾-in. 0.62 0.66 1-in. 5.65 5.80 ½-in. 0.70 0.90 1.46 1.46 1.46 1.46	Milled headless set screws, cut thread80

| Per 100 Net | S.A.E. U.S.S. | S.A.E. U.S.S. | V.S.S. |

Larger sizes .- Prices on application.

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent more than above for car lots.

On hot-pressed and cold-punched nuts the discount is 25c. more per 100 lb. than quoted above for car lots.

Milled headless set screws, cut thread.......80
Upset hex. head cap screws, U.S.S. thread.
85 and 5

Upset hex. cap screws, S.A.E. thread. .85 and 5

Chicago

Pending Structural Work Totals 80,000 Tons—Merchant Stack Blown In

CHICAGO, March 22.—Inquiry for forward requirements in finished steel is not so active as a week ago. Specifications continue to exceed shipments by a small margin, and sales appear to assure the present rate of

ingot production for the immediate future.

The demand for structural material is more lively, and Western fabricators are now able to list over 80,000 tons that will be required for active projects in and tributary to Chicago. Erection of oil storage tanks in the Southwest is making rapid progress as weather conditions become more favorable. Orders for plates for tank work this week total 10,000 tons, and fresh inquiry now stands at close to 12,000 tons.

Featuring the mild steel bar market are the unusually large number of orders and their diversification both as to sizes and buyers. Orders for track accessories are in good volume, and the rate of production is pointing upward. The bulk of this business is being placed quietly. Railroad equipment orders include 42 passenger cars, 500 freight cars, 584 underframes and an oil-electric locomotive, the latter having been ordered by the Chicago & North Western from

the Ingersoll-Rand Co.

Pig Iron.—Although not so heavy as a week ago, forward contracting is progressing steadily and the market is firm at \$20, base Chicago furnace. Two users in Milwaukee have purchased a total of 1500 tons of foundry iron at \$20, base, and a stove manufacturer in Kalamazoo, Mich., will buy 1000 to 2000 tons. A Federal furnace was blown in March 18, bringing the total count of active merchant stacks in this district up to five. March shipments of pig iron are running equal to those of February, but indications are that total deliveries for the first quarter will fall short of those for the corresponding period a year ago.

Prices per gross ton at Chicago: Northern No. 2 foundry, sil. 1.

Northern No. 2 foundry, sil. 1.75	
to 2.25	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil	20.00
High phosphorus	20.00
Lake Superior charcoal, averag-	
ing sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	24.01
Southern No. 2 (barge and rail)	22.18
Low phos., sil. 1 to 2 per cent,	
copper free\$31.50 to	32.50
Silvery, sil. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15	
per cent	46.79

Prices are delivered at consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The demand for carload lots of spiegeleisen is growing, but in this district it can be met only by a charcoal furnace of small capacity in Michigan and by foreign cargoes landed at New Orleans.

Prices delivered Chicago: 80 per cent ferromanganese, \$107.56; 50 per cent ferrosilicon, \$85; spiegeleisen, 18 to 22 per cent, \$44.76.

Plates.—Railroad equipment orders this week have been small but fairly numerous, and outstanding inquiry before the trade is close to the low point of the first quarter. The Wabash bought 42 passenger and dining cars from three Western builders, and the Soo Line has purchased 84 caboose car underframes. The Pressed Steel Car Co. has taken an order for 500 underframes from the Great Northern, and the Denver & Rio Grande Western is said to have placed 300 automobile cars with the Mount Vernon Car Mfg. Co. Car building programs are well under way, and estimates show that about 60 per cent of the steel required for contracts placed since the first of the year has been specified. Road conditions in the oil fields of the Southwest have improved, and fabricated tankage material is moving to erection sites more freely. Lower prices for crude oil and production in excess of demand have created a further demand for tanks, and Western mills

have booked 10,000 tons of plates for tank work. Inquiry totals 10,000 to 15,000 tons. Mill prices on plates range from 2c. to 2.10c., Chicago, and producers are taking a firmer stand for the higher figure on miscellaneous and small orders.

Mill prices on plates per lb: 2c. to 2.10c., Chicago.

Structural Material.—The American Bridge Co. has been awarded 1500 tons for the City Bank of Chicago, and a fabricator at Pittsburgh is said to have taken 5000 tons for a bridge across the Mississippi River at Cairo, Ill. Individual contracts for 100 tons and less are more numerous, but the smaller shops in and close to Chicago have not been able to increase operations above 25 to 35 per cent of capacity. Twelve of the most active projects in this district total 80,000 tons. Of special note among these are the Marshall Field & Co., Chicago, warehouse, 40,000 tons; the Chicago Daily News building, 11,000 tons, and two bridges across the Mississippi River, 7000 tons. Structural shops to the south, to the west and at Minneapolis are said to have order books that provide for operations in excess of 60 per cent of capacity. Mill prices on plain material are steady, and deliveries are prompt.

Mill prices on plain material per lb.: 2c. to 2.10c., Chicago.

Bars.—Specifications for soft steel bars are being maintained at the average of last week, and new buying is still a trifle ahead of shipments. Mill backlogs average four to six weeks, and in some sizes delivery is not better than 30 days. What interest there may have been two weeks ago in forward buying is not shown now, and sellers are handling an unusually large number of small orders. The demand is widespread among virtually all users, and sellers report that orders on books are the most widely diversified in the history of steel production in this district. Tractor plants and threshing machinery builders are busy, but other lines of agricultural machinery are slow, the industry being engaged at not more than 70 per cent of capacity. Makers of cold-drawn products are placing liberal specifications for soft steel bars. Orders for iron bars are in fair volume, with prices steady at 2c. The demand for alloy steel bars is growing slowly, and the price schedule is being well maintained. Orders for rail steel bars are approximately equal to shipments. Both Chicago Heights mills are operating double-turn and with a trifle heavier schedule than was the case last month. In Chicago 2c. is more readily obtained for hard steel bars than in outlying districts, where the ruling price is 1.90c., Chicago.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., Chlcago; common bar iron, 2c., Chicago; rail steel bars, 1.90c. to 2c., Chicago.

Reinforcing Bars.—Engineers and architects, who have been busily engaged during the winter months in the preparation of plans, are now actively in the market for bids on reinforcing bars. Several fresh inquiries this week call for upward of 400 tons each, but the bulk of new projects consists largely of buildings which require only a small tonnage of concrete reinforcement. A warehouse at Milwaukee, requiring 400 tons, has been placed, and a contract has been closed for a Chicago warehouse that will take 350 tons of hard steel reinforcing bars. Considerable optimism exists throughout the trade, the feeling being that contractors will not delay much longer the placing of a fair part of the tonnage upon which figures have been submitted. Prices are firm for small tonnages. Billet steel reinforcing bars are being quoted 2.30c. to 2.75c., warehouse, and rail steel reinforcing bars at 2.10c. to 2.55c., Chicago. New contracts and fresh projects are shown on page 903.

Wire Products.—The general demand has held close to the average of a week ago. The trend of business in the near future is not well defined in the minds of producers, who are holding production at a steady gait and are making up the difference between production and shipments from mill stocks. Specifications from the manufacturing trade are somewhat larger, and contracting so far this month gives promise of making the March volume the largest since last October. Shipments for the last three weeks total larger than for any period of similar length since early last fall. The demand from the jobbing trade is widespread. Prices in and close to Chicago are steady, but competition for nail orders is unusually keen further west.

Bolts, Nuts and Rivets.—Buyers of bolts and nuts are offering little or no resistance to contracts that have been prepared on the basis of the new list prices. The discount on small rivets remains unchanged for the time being, but makers of large rivets have announced a new base price of \$2.85 per 100 lb., Chicago, to become effective April 1.

Rails and Track Supplies.—Rail mills in the Chicago district are operating at 85 per cent of capacity, but within a few weeks several contracts will have been completed and production will point downward. The Detroit & Toledo Shore Line has awarded 1100 tons of standard-section rails and the necessary accessories to the Illinois Steel Co. The Pennsylvania Railroad is in the market for 7000 kegs of spikes, 800 kegs of bolts, 1500 tons of angle bars, and 1100 tons of tie plates. Second quarter track accessory requirements for the Chesapeake & Ohio have not been awarded. A Western user has ordered 800 tons of iron tie plates from a Chicago producer. Specifications for track supplies are growing, and production now stands at 60 per cent of capacity in spikes, bolts and angle bars and at 85 per cent in tie plates.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43: light rails, rolled from billets, \$36 to \$38. Per 1b.: Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Sheets.—Specifications for sheets are approximately equal to production, which now stands at 85 per cent of capacity. The price of the blue annealed product is stronger, and quotations range from 2.40c. to 2.50c., Chicago. The demand for the galvanized and black is light as compared with that for blue annealed. Deliveries average five weeks for blue annealed and three weeks for black and galvanized sheets.

Prices per lb., delivered from mill in Chicago: No. 24 black, 3c. to 3.10c.; No. 24 galvanized, 3.90c. to 4c.; No. 10 blue annealed, 2.40c. to 2.50c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cold-Rolled Strip.—The demand has grown rapidly, and production now stands at about 90 per cent of capacity. Chicago delivered prices are well maintained within the range of 3.30c. to 3.55c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. is the only bidder on 477 tons of 36-in. Class B pipe for Milwaukee. The price named is \$35.75, Birmingham, or \$44.25, delivered. It is reported here that Detroit has divided 6300 tons of 8-in. Class B pipe between the United States company and the National Cast Iron Pipe Co. The McWane Cast Iron Pipe Co. has taken 100 tons of small-diameter pipe for Medina, Ohio, and the Lynchburg Foundry Co. is low bidder on 100 tons of 6-in. Class C pipe for Springfield, Ill. Fresh inquiry includes 125 tons of 12-in. Class C pipe for Detroit, 825 tons of 24-in. Class B for Highland Park, Mich., and a small tonnage of fittings for Chicago. Orders for less than 100 tons each are in good number. Chicago quotations for 6-in. and larger di-

Warehouse Prices, f.o.b. Chicago

Tratemodel a reces, atomic Careago
Base per Lb.
Plates and structural shapes 3.10c.
Soft steel bars 3.00c.
Reinforcing bars, billet steel2.30c. to 2.75c.
Cold-finished steel bars and shafting-
Rounds and hexagons 3.60c.
Flats and squares 4.10c.
Bands 3.65c.
Hoops 4.15c.
Black sheets (No. 24)3.05c. to 3.15c.
Galvanized sheets (No. 24)3.90c. to 4.00c.
Blue annealed sheets (No. 10)2.40c. to 2.45c.
Spikes, standard railroad 3.55c.
Track bolts 4.55c.
Rivets, structural 3.50c.
Rivets, boiler 3.70c.
Per Cent Off List
Machine bolts
Carriage bolts
Coach or lag screws55 and 5
Hot-pressed nuts, squares, tapped or blank,
3.25c. off per lb.
Hot-pressed nuts, hexagons, tapped or blank,
3.75c. off per lb.
No. 8 black annealed wire, per 100 lb\$3.20
Common wire nails, base per keg 2.95
Cement coated nails, base per keg 2.95

ameters range from \$44.20 to \$45.20, with a tendency to advance to the higher price.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$44.20 to \$45.20; 4-in., \$48.20 to \$49.20; Class A and gas pipe, \$4 extra.

Old Material.—Heavy melting steel has advanced as the result of a consumer purchase at \$13.50. On the whole, this market has a stronger tone, and miscellaneous sales this week indicate that prices at least at the moment are tending to advance. Consumers are disposed to buy quietly so as not to disturb the present low price situation, but dealers who are now close to the end of many 60-day contracts are exerting pressure to bring price levels up in anticipation of a more active market in the near future. Shipments of railroad scrap have been comparatively light this month. The Chicago & North Western has not issued a list for 30 days, and the Santa Fe list for March is about three weeks late.

Prices delivered consumers' yards, Chicago:

Per Gross Ton			
Heavy melting steel	13.00 to 12.75 to		
apart, and miscellaneous rails.	14.50 to	15.00	
Steel rails, less than 3 ft	16.50 to	17.00	
Iron rails	13.50 to	14.00	
Hydraulic compressed sheets	11.50 to	12.00	
Drop forge flashings	9.50 to	10.00	
Machine shop turnings	7.50 to	8.00	
Forged, cast and rolled steel car-			
wheels	16.25 to		
Railroad tires, charging box size	16.50 to		
Railroad leaf springs, cut apart	16.25 to		
Steel couplers and knuckles	15.50 to		
Coil springs	16.50 to		
Low phosphorus punchings	15.50 to		
Axle turnings, foundry grade	13.00 to		
Axle turnings, blast fur. grade	11.00 to		
Cast iron borings	10.25 to		
Short shoveling turnings	10.25 to		
*Relaying rails, 56 to 60 lb	25.50 to		
Relaying rails, 65 lb. and heavier	26.00 to		
Rerolling rails	15.50 to		
Railroad malleable	16.00 to		
Agricultural malleable	14.75 to		
Angle bars, steel	14.75 to		
Cast iron carwheels	15.00 to	15.50	
Per Net Ton			
No. 1 machinems and	10 50 40	17 00	

Per Net Ton		
No. 1 machinery cast	16.50 to	17.00
No. 1 railroad cast	15.75 to	16.25
No. 1 agricultural cast	14.75 to	15.25
Stove plate	13.25 to	
Grate bars		
Brake shoes		
Iron angle and splice bars		
Iron arch bars and transoms	18.75 to	19.25
Iron car axles		
Steel car axles		
No. 1 railroad wrought		
No. 2 railroad wrought		
No. 1 busheling		
No. 2 busheling		
Locomotive tires, smooth		
Pipes and flues	8.00 to	8.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

American Radiator Co., New York, reports net profit for 1926 of \$12,476,485 after all charges, equivalent after preferred dividends to \$9.65 a share on the 1,242,561 shares of common stock outstanding. This compares with \$11,663,601 or \$8.97 a share in 1925.

George J. Whelan and associates in the Universal Pipe and Radiator Co. have acquired over 50 per cent of the 123,378 shares of common stock outstanding in the Pressed Steel Car Co., New York. The Whelan group has also acquired a substantial interest in the Walworth Co., Boston.

Western Electric Co., Inc., Chicago, reports net income of \$14,574,038 for the year ended Dec. 31, 1926, equivalent to \$19.43 a share on the 750,000 shares of no par capital stock outstanding. In 1925 net income amounted to \$14,283,302, equivalent after preferred dividends to \$17.40 a share on the common stock.

The soapless lubricating grease process developed by A. L. Nugey, 37 New Church Street, Rahway, N. J., has been taken over by the Swan-Finch Oil Corporation, New York. The company owns three plants—at Elizabeth, N. J., Buffalo and Chicago. There are branches at Syracuse, Boston, Pittsburgh and Detroit.

New York

Pig Iron Demand Recedes—Consumers Taking Steel More Freely

New York, March 22.—Although it is clear that the buying movement in pig iron has passed its crest, sales by local brokers during the past week totaled close to 14,000 tons, falling only about 1000 tons short of the figure for the previous week. Some of the ton-nage sold, however, was for delivery outside of this district. The Central Foundry Co., New York, has placed 5000 tons for third quarter, of which 1000 tons was for its Lansdale, Pa., plant, 3000 tons was for Dundalk, Md., and 1000 tons was for its Essex plant, Newark, N. J. A New Jersey plant that was in the market for 2500 tons of foundry and malleable for second quarter has completed purchases calling for a total of 4500 tons. The Richardson & Boynton Co., New York, is inquiring for 900 tons of No. 2 plain and 750 tons of No. 2X for second quarter delivery to its Dover, N. J., plant. The New York Central Railroad is asking for bids on 425 tons of various grades for shipment to its Frankfort, N. Y., or Elkhart, Ind., shops. Another pending inquiry calls for 1000 tons of foundry iron for third quarter delivery to a melter in this district. Buffalo and eastern New York State furnaces have figured most prominently in recent sales, taking some business in the heart of eastern Pennsyl-Some furnaces have announced advances to \$17.50 and others to \$18, base Buffalo, but those prices have not yet been thoroughly tested since large tonnages recently placed were closed at lower figures. Eastern Pennsylvania foundry iron is unchanged at \$20.50 to \$21, base furnace. Sales of Virginia foundry have been made at as low as \$20.50, base furnace, or 50c. lower than the recent minimum.

A contract for the tunnel at Fifty-third Street and East River, New York, has been formally awarded to Patrick McGovern, Inc., New York, and work will probably begin in the next fortnight. Included in the contract is the purchase of about 20,000 tons of cast iron

segments.

Ferroalloys.—A large automobile manufacturer is inquiring for 1000 tons of ferromanganese, having been unable, it is stated, to obtain 500 tons of spiegeleisen in recent weeks. Outside of this, the ferromanganese market is quiet with purchases confined to carload and small lots. Prices continue unchanged at \$100, seaboard or furnace. In the spiegeleisen market there is no pronounced activity, particularly as regards large quantities, because supplies are not plentiful. There has been no change in prices. Specifications on contract for ferromanganese, spiegeleisen, ferrosilicon and ferrochromium continue heavy.

Finished Material.-While conditions in this market have not changed materially in the last two weeks, there is a tendency toward somewhat firmer prices. Consumers are releasing specifications at a slightly better rate and the volume of new orders is about the The recently established prices on sheets can hardly be said to have become much more than quoting prices, although some business has been placed at 2.25c., Pittsburgh, for blue annealed, and 3.75c., Pittsburgh, for galvanized. Buying of drum stock by the oil supply companies in the last few days has not helped the price situation on black sheets, as substantial tonnages of one-pass material offered an unusually attractive backlog to producers with the consequent appearance of rather low prices. Shading of more than \$2 a ton of the established prices, however, is the exception rather than the rule, and there is a firmer tone throughout the market, particularly for second quarter. The same situation holds in hot-rolled strips where quotations of 2.30c. Pittsburgh, for narrow and 2.10c. for the wider sizes are still above prices at which business is being done. Mild weather conditions have brought in a considerable number of orders for butt-weld pipe. The mills are well booked on lap-weld material, but the low price of oil and tendency toward overproduction seem certain to bring about a tapering of demand before the end of the summer. Wire products are finding a better demand. Bookings of fabricated structural steel during the week were not large.

Mill prices per lb., delivered New York: Soft steel bars, 2.24c.; plates, 2.14c. to 2.24c.; structural shapes, 2.14c. to 2.24c.; bar iron, 2.14c. to 2.24c.

Warehouse Business.—Demand is increasing, and prices on all products continue fairly firm. Recently there has been a good tonnage of blue annealed and galvanized sheets moving from stock, lots involved ranging up to several tons to a customer. Tonnages of structural material are also larger, totaling from 2 or 3 tons to as much as 10 tons and more to an order. The new lists, discounts and extras on bolts, nuts,

Warehouse Prices, f.o.b. New York

Base per Lb.
Plates and structural shapes 3.34c.
Soft steel bars and small shapes 3.24c.
Iron bars
Cold-finished steel shafting and screw stock—
Flats and squares 4.50c.
Hoops 4.49c
Bands 3.99c.
Blue annealed sheets (No. 10 gage) 3.89c.
Flats and squares
Wire, black annealed
Wire, galvanized annealed
Wire, galvanized annealed
larger 3.65c
Open-hearth spring steel, bases4.50c. to 7.00c.
Per Cent Off List
Machine holts cut thread 40, 10 and 10
Carriage bolts, cut thread30 and 10 Coach screws40, 10 and 10
Boiler Tubes— Per 100 Ft.
Lap welded steel, 2-in\$17.33
Seamless steel. 2-in
Charcoal iron, 2-in
Discounts on Welded Pipe
Standard Steel— Black Galv.
½-in. butt
%-in. butt
7 and 8-in. lap 44 17
11 and 12-in. lap 37 12
Wrought Iron-
½-in. butt 4 +19
%-in. butt 11 + 9
1-1½-in. butt
2-in. lap
7-12-in. lap
Tin Plate (14 x 20 in.)
Coke, 100 lb. base box \$6.45 \$6.20
Charcoal, per box— A AAA
IC \$9.70 \$12.10 IX 12.00 14.25
IX
Terne Plate (14 x 20 in.)
1C-20-lb. coating\$10.00 to \$11.00
IC—30-lb. coating
Sheets, Box Annealed-Black, C. R. One Pass
Per Lb.
Nos. 18 to 20 4.00c.
No. 22 4.15c.
No. 24
No. 28* 4.45c.
No. 30 4.70c.
Sheets, Galvanized
Per Lb.
No. 14
No. 164.45c, to 4.70c.
No. 18 4.60c.
No. 20 4.75c.
No. 22 4.80c. No. 24 4.95c.
No. 26 5.20c.
No. 28* 5.45c.
No. 30 5.85c.
*No. 28 and lighter, 36 in. wide, 20c. higher
-No. 25 and fighter, 50 m. wide, 20c. figher

per 100 lb.

rivets and screws will probably be made effective by warehouses on April 1, the date when manufacturers begin using the new schedules. Meanwhile, transactions are on the old basis.

Reinforcing Bars.—No orders for large tonnages of bars have been reported, but the number of small orders taken during the week has shown a substantial increase. No sizable inquiries have appeared recently. The price situation is unchanged, but there is a growing tendency on the part of the distributers in this territory to bid in large jobs on the pound basis, thus combining the mill and Youngstown warehouse prices. In some cases this results in a substantial saving on the warehouse price. The mill price seems to be holding, and several of the large jobs taken recently have brought this figure without much difficulty.

Prices per lb. on billet steel reinforcing bars: From mill, 2c. Pittsburgh. Out of New York warehouse, 3.15c., delivered at Job. Out of Youngstown warehouse, 2.50c., Youngstown, or 2.87½c., delivered New York.

Cast Iron Pipe.—Purchasing by municipalities and private consumers of gas and water pipe continues small. On the recent opening of contractors' bids by the Department of Water Supply, Gas and Electricity, New York, the Wataga Contracting Co., Brooklyn, N. Y., was low bidder on installation work involving the purchase of about 500 tons of 12-in. pipe. The Department of Purchase, New York, has awarded to the low bidders the 10,000 tons of pipe on which bids were opened Feb. 24. Tonnage was distributed as follows: United States Cast Iron Pipe & Foundry Co., 4700 tons; Donaldson Iron Co., 2000 tons; R. D. Wood & Co., 2000 tons, and the Warren Foundry & Pipe Co., 1700 tons. While competition for tonnage is still keen, prices no longer show a downward tendency and on the smaller sizes the market is firm.

Prices per net ton, delivered New York: Water pipe, 6-in. and larger, \$47.60 to \$48.60; 4-in. and 5-in.. \$52.60 to \$53.60; 3-in., \$62.60 to \$63.60; Class A and gas pipe, \$5 extra.

Coke.—Current demand for foundry and furnace grades continues small, but specifications against contracts are still satisfactory. Prices are substantially unchanged at \$4.50 to \$5 per net ton, Connellsville, for foundry grade and at \$3.25 to \$3.75 per ton for standard furnace. Delivered prices of foundry coke are: To northern New Jersey, \$8.53 to \$9.03; New York or Brooklyn, \$9.29 to \$9.79; Newark or Jersey City, N. J., \$8.41 to \$8.91 per ton. By-product foundry coke ranges from \$9.59 to \$10.77 per net ton, delivered Newark or Jersey City, N. J.

Old Material.—Prices are substantially unchanged in a quiet market. No. 1 heavy melting steel is being purchased at \$14.50 per ton, delivered to consumers at Bethlehem, Coatesville, Conshohocken and Pottsville. Pa. Borings and turnings continue active at \$10.50 to \$11 per ton, delivered eastern Pennsylvania. Yard steel is quiet at \$12 per ton, delivered. Brokers foresee no immediate change in the market, either toward higher or lower prices.

her or lower prices.	
Dealers' buying prices per gross ton, New York:	
No. 1 heavy melting steel \$11.00 to \$11.85	
Heavy melting steel (yard) 8.25 to 8.50	
No. 1 heavy breakable cast 11.75 to 13.00	
Stove plate (steel works) 8,50 to 8.75	
Locomotive grate bars 9.00 to 9.50	
No. 1 railroad wrought 12.50 to 13.50	
No. 1 yard wrought, long 11.50 to 12.50	
Machine shop turnings 7.50 to 8.00	
Cast borings (blast furnace or	
steel works) 8.00 to 8.25	
Mixed borings and turnings 7.50 to 8.00	
Steel car axles 16.00 to 16.50	
Iron car axles 24.00 to 24.50	
Iron and steel pipe (1 in. diam.,	
not under 2 ft. long) 9.25 to 9.75	
Forge fire 8.00 to 8.50	
Rails for rolling 11.50 to 12.00	
Cast iron carwheels 11.00 to 11.50	
Stove plate (foundry) 10.00 to 10.50	
Malleable cast (railroad) 12.50 to 13.00	
Cast borings (chemical) 12.50 to 13.00	
Prices per gross ton, delivered local foundries:	
No. 1 machinery cast\$15.00 to \$15.50 No. 1 heavy cast (columns, build-	
ing materials, etc.), cupola size 13,50 to 14.00 No. 2 cast (radiators, cast boil-	
ers, etc.) 12.50 to 13.00	

Two 1500-ton hot metal mixers to be installed at the Ohio works Carnegie Steel Co., Youngstown, will be furnished by the Pennsylvania Engineering Works, New Castle, Pa. Mixers of that capacity represent the maximum thus far attempted.

Cleveland

Volume of Steel Buying Maintained, Though Individual Orders Are Small

CLEVELAND, March 22.—The current demand for finished steel is holding up to the recent satisfactory volume. Orders are numerous but are not for large lots, indicating that consumers are continuing the policy of buying only for early requirements. A moderate volume of activity has developed in contracts for steel bars and plates for the second quarter at the prevailing prices. Not much bar tonnage will be carried over from the first quarter, as contracting for the present quarter was not heavy. However, many of the smaller plate consumers have not taken out all the tonnage covered by their contracts.

The automotive industry continues to take a heavy tonnage of steel but is limiting specifications to early needs. With the exception of one or two second quarter contracts, motor car manufacturers have not bought for delivery beyond May. While automobile production on the whole is going along at a good rate, there is still considerable unemployment and part-time employment in Detroit.

The uncertainty of the coal situation has aroused little concern among steel producers and consumers in this territory, although, because of it, some of the sheet mills are not disposed to take contracts for the entire quarter at the ruling prices. In the building field a fair amount of work is in prospect in this territory, but it is slow in coming out. Prices quoted by outside mills are steady at 1.90c., Pittsburgh, on steel bars, plates and structural material. The usual quotation on bars by a Cleveland producer is 1.90c., Cleveland, although some business has been taken at 1.80c.

Iron Ore.-The consumption of Lake Superior ore during February amounted to 4,233,863 gross tons, a decrease of 290,000 tons as compared with January. The amount consumed in February last year was 4,-389,375 tons. The amount of ore on hand at furnaces March 1 was 23,745,924 tons, and the total at furnaces and Lake Erie docks on that date was 29,808,532 tons, as compared with 27,676,323 tons on the same date a year ago. Central district furnaces consumed in February 2,249,156 tons, a decrease of 184,190 tons. front furnaces used 1,745,797 tons, a decrease of 80,528 tons. Eastern furnaces consumed 103,439 tons, a decrease of 12,217 tons, and all-rail furnaces used 135,471 tons, a decrease of 13,065 tons. There were 179 furnaces using Lake ore in blast Feb. 28, an increase of eight for the month.

Pig Iron.—The market was fairly active in the past week, during which Cleveland interests sold 35,000 tons, as compared with 30,000 tons during the previous week. The most active demand for the past two weeks has been in Michigan, where considerable iron is being bought by the automotive industry. Two lots of 4000 tons each were placed during the week by automobile foundries. Other buying was well scattered and confined to small lots, mostly from the smaller foundries. While a few inquiries for the third quarter have come out, neither producers nor consumers are as yet showing much interest in that delivery. However, one local producer expects to open its books shortly for the third quarter at the current prices. The market is firm at recent price levels. One Cleveland producer is quoting foundry and malleable iron at \$18.50, furnace, for shipment in the northern Ohio territory, but this price

Warehouse Prices, f.o.b. Cleveland Base per Lb. Plates and structural shapes. 3.00c. Soft steel bars. 2.75c. to 3.00c. Cold-finished rounds and hexagons 3.65c. Cold-finished flats and squares 4.15c. Hoops and bands 3.65c. Cold-rolled strip *5.95c. Black sheets (No. 24) 3.65c. Galvanized sheets (No. 24) 4.50c. Blue annealed sheets (No. 10) 3.25c. No. 9 annealed wire, per 100 lb \$2.90 No. 9 galvanized wire, per 100 lb 3.35 Common wire nails, base, per keg 2.90

*Net base, including boxing and cutting to length.

probably will still be shaded where it is necessary to absorb freight rates in competition at points at a considerable distance. However, an Indiana melter paid \$18.50, Cleveland, for a 200-ton lot. There is virtually no local demand, as Cleveland foundries are covered for the second quarter, and the same is generally true of other northern Ohio foundries. The Valley market is firm at \$18.50, furnace, and in Michigan \$19.50 furnace, is not being shaded. With the improved situation in the automotive industry, the melt is heavy, and some of the producers will ship more iron than they make in March.

 Prices per gross ton at Cleveland:
 \$20.00

 N°th'n No. 2 fdy., sll. 1.75 to 2.25.
 \$24.00

 Southern fdy., sll. 1.75 to 2.25.
 24.00

 Malleable
 20.00

 Ohlo silvery, 8 per cent
 31.5

 Basic, Valley furnace
 18.5

 Standard low phos., Valley furn
 28.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—The demand has shown a further gain and is good except for common grades, which are only moderately active. Enameling stock is moving well. A fair number of consumers have covered with contracts for the second quarter or for two months. Prices show little change, and weak spots are still in evidence. Steel barrel manufacturers who have not yet bought for the second quarter have been quoted 2.65c., Pittsburgh, for black sheets for that delivery, although for current orders mills are asking 2.70c. for barrel stock. The common range to consumers outside of the barrel industry is 2.75c. to 2.80c., although some business carrying a good extra is reported to have been placed at 2.60c., Pittsburgh, in the past week. On blue annealed sheets 2.20c., Pittsburgh or mill, is usually the minimum quotation, although a 1000-ton sale is reported at about 2.10c., Pittsburgh. Galvanized sheets are holding fairly well at 3.75c., mill, although there are reports of quotations of 3.60c., Pittsburgh.

Strip Steel.—New demand for hot-rolled strip is very light, as most consumers are covered by contracts taken before the price advance. New prices have not been thoroughly tested. Some carlot business in cold-rolled strip is coming out at 3c., Cleveland, which appears to be well maintained on new business. However, most consumers have contracts at lower prices, some of these being for the second quarter.

Semi-Finished Steel.—Mills have not yet named prices for the second quarter, although there seems to be a disposition to hold to the present quotation of \$34, Cleveland and Youngstown, on sheet bars, billets and slabs.

Reinforcing Bars.—Inquiry is out for a sewer in Akron, Ohio, requiring 1000 tons. Not much other work is being figured on. Rail steel bars are unchanged at 1.75c. to 1.80c., mill.

Warehouse Business.—Jobbers are getting a fair volume of business, which shows a slight gain over February. Regular prices are being generally adhered to on all products.

Bolts, Nuts and Rivets.—Some contracts for bolts and nuts have been closed for the second quarter at the new list prices. Consumers appear to be satisfied with the change. Orders against old contracts continue good. Rivet manufacturers have adopted a new price list on large rivets. Extras have been reduced considerably, and the leading local manufacturer has announced a \$9 a ton advance on the base price to \$2.75 per 100 lb., base Cleveland or Pittsburgh, and to \$2.85, Chicago, for the second quarter. The same maker has also announced 70 and 10 per cent off list for small rivets for the same delivery. New prices are also out on cap and set screws, which are reduced 5 per cent or more. New prices are also being brought out on semi-finished castellated and slotted nuts. These will hereafter be quoted at list prices, subject to 70 per cent discount.

Coke.—Some contracts are being closed for foundry coke for the second quarter at prices ranging from \$4.75 to \$5.50, Connellsville. The spot coke market is firm, as producers have little to offer for the remainder of the month.

Old Material.-Inquiries from one or two dealers for

heavy melting steel for shipment to a Cleveland milithat had not been a buyer in the open market for a long time caused some excitement in the local market during the week and a stiffening of prices on this grade. Some material was sold for delivery to this mill at \$15.75, although dealers offered only \$14.75 to \$15 for heavy melting steel for another local mill less exacting in its requirements. It is stated that the tonnage involved in the local buying was not large and has all been covered.

2	rices per gross ton, delivered co	nsumers'	yards
	No. 1 heavy melting steel	15.00 to 1	15.90
	No. 2 heavy melting steel	14.50 to	15.00
	Rails under 3 ft	18.00 to	18.50
	Compressed sheet steel	13.75 to	14.25
	Light bundled sheet stampings	12.00 to	12.50
	Drop forge flashings, 15 in. and	22.00 00	22.00
	under	14.00 to	14.50
	Machine shop turnings	9.00 to	9.50
	Steel axle turnings	12.50 to	13.00
	Low phosphorus billet, bloom and	20.00 00	20.00
	slab crops	18.00 to	18.50
	Low phosphorus sheet bar crops.	16.50 to	17.00
	Low phosphorus plate scrap	16.00 to	16.50
	Low phosphorus forging crops	16.50 to	17.00
	Cast iron borings	11.50 to	11.75
	Mixed borings and short turnings	11.50 to	11.75
	No. 1 railroad wrought	11.50 to	12.00
		14.00 to	14.50
	No. 2 railroad wrought	12.50 to	12.75
	No. 1 busheling		11.75
	No. 2 busheling	11.50 to	
*	Pipes and flues	10.00 to	10.50
	Rails for rolling	16.25 to	16.50
	No. 1 cast	16.00 to	16.50
	Railroad grate bars	12.00 to	12.50
	Stove plate	12.00 to	12.50
	Railroad malleable	15.50 to	16.00

Philadelphia

Pennsylvania Railroad Out for Second Quarter Steel, About 25,000 Tons

PHILADELPHIA, March 22.—The Pennsylvania Railroad has asked for bids by March 30 on 15,000 tons of plates, 5500 tons of bars, 1000 tons of structural shapes and smaller lots of sheets, wire products, billets, etc., making a total of about 25,000 tons, covering its requirements for second quarter. The road will follow its recent custom of receiving open bids as required by the Clayton Act in cases where a director of a railroad company is also a director of a steel company. The Chesapeake & Ohio Railroad has also asked for bids on its second quarter requirements, amounting to about 3000 tons of plates, shapes and bars.

Orders for some finished steel products during the past week have shown a slight gain, but no more than normal expansion of seasonal requirements might produce. Sheet and structural shape mills in the East now show a fairly good operation, but other products rolled by the mills of this district are no more than holding their own.

Pig iron is firmer, with no actual change in price, but one or two producers anticipate an advance in their quotations if the coal situation on April 1 indicates

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier Plates, ¼-in. Structural shapes Soft steel bars, small shapes and	2.80c. to 3.00c. 3.00c. to 3.20c. 2.65c. to 3.00c.
iron bars (except bands) Round-edge iron Round-edge steel, iron finished,	2.80c. to 3.20c. 3.50c.
1½ x 1½ in	3.50c. 4.30c.
twisted and deformed	3.00c.
hexagons	4.00c.
flats	4.50c.
Steel bands, No. 12 gage to %-in.,	
inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.15c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10) Diamond pattern floor plates—	3.30c.
¼-in	
n	
Rails	
Swedish iron bars	6.60c.

higher prices for coke. The scrap market continues dull.

Pig Iron.—Sales of foundry iron amounting to a few thousand tons in the past week have been at the full price of \$21, base, at furnace, in most instances, with here and there a slight concession in the delivered price when a furnace has found it necessary to equalize freight rates with a competitor. The firmer attitude which producers are taking is due not only to the well sold-up condition of their order books, but also to an expectation that coke prices after April 1 may be higher if the soft coal strike assumes any importance. The first sale reported for third quarter is 5000 tons bought by the Central Foundry Co. for its plants at Newark, N. J., Lansdale, Pa., and Dundalk, Md. Among current inquiries is one from the Standard Steel Works Co., Burnham, Pa., for 1500 to 2000 tons of low phosphorus iron for early delivery. The first shipload of low phosphorus iron from England since the coal strike in that country will reach Philadelphia next week after the higher pig iron duty goes into effect. The shipment amounts to 2200 tons, most of which was sold be-fore shipment from the other side. Quoted prices on English low phosphorus iron are \$25, Philadelphia, duty paid, while domestic quotations remain at \$25, furnace, for copper-free and \$24, furnace, for copperbearing iron.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25		
sil	\$21.76 to	\$22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to	22.76
East. Pa. No. 1X	22.76 to	23.26
Basic (delivered eastern Pa.)	20.75 to	21.25
Gray forge	21.00 to	21.50
Malleable		
Standard low phos. (f.o.b. New		
York State furnace)		25.00
Copper bearing low phos. (f.o.b.		
furnace)	25.00 to	26.00
Virginia No. 2 plain, 1.75 to 2.25		
* sil	26.17 to	26.67
Virginia No. 2X, 2.25 to 2.75 sil.	26.67 to	27.17
100-200-200-200-200-200-200-200-200-200-		

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$5.17 from Virginia furnaces.

Plates.—Although there has been no increase in the demand for plates, prices seem to be firmer than they were a few weeks ago. The majority of sales are at 1.90c., Pittsburgh, and reports indicate that only such special buyers as car builders and shipbuilding companies are obtaining concessions. Eastern mills continue to operate at about 50 to 60 per cent.

Structural Shapes.—A slight gain in orders for structural shapes has given Eastern mills a better rate of operation, but the volume has not attained the proportions which some have expected to come with the opening of the spring building season. The price situation has shown no change, ordinary lots being quoted at 1.80c., to 1.90c., Pittsburgh, with concessions on large tonnages. Very little fabricated steel work is being figured on in the immediate Philadelphia district. The largest local project is an office building at Fifteenth and Walnut Streets, calling for 2000 tons.

Bars.—Demand both for merchant bars and for concrete reinforcing bars is slow. Building projects requiring bars are few, and the tonnages are small. Consumers of merchant bars are ordering sparingly and are not anticipating their second quarter needs to any extent. Quotations remain at 1.90c., Pittsburgh.

Sheets.—Some sales of blue annealed sheets have been made at 2.25c., Pittsburgh, but the extent to which consumers were covered at 2.20c. or lower indicates that a little more time is needed to establish the new price. Black and galvanized sheets for early shipment can still be obtained at concessions from the recently announced quotations of 2.90c. and 3.75c. respectively. These latter prices, however, are being quoted for second quarter.

Imports.—Last week's imports at Philadelphia included 1010 tons of pig iron from British India, 400 tons from the Netherlands and 250 tons from Germany. Iron ore from Algeria amounted to 6030 tons, and manganese ore from British India totaled 2000 tons.

Old Material.—Efforts of a leading consumer of steel scrap to buy a tonnage at \$14.50 are said to have been unsuccessful, but it is intimated that sales would be made at \$15. The scrap market continues dull, and prices are unchanged. The general view of brokers is that prices have reached bottom.

Prices per gross ton, delivered con Philadelphia district:	ısumers'	yards,
No. 1 heavy melting steel\$! Scrap T rails No. 2 heavy melting steel No. 1 railroad wrought Bundled sheets (for steel works) Machine shop turnings (for steel	14.00 to 1 12.00 to 1 17.00 to 1	15.00 14.50 13.50 17.25 12.00
works)	a bridge	12.00
lent) Cast borings (for steel works and	13.50 to	14.00
rolling mill)	12.00 to	13.00
works)		16.00
Railroad grate bars	12.25 to	13.00
	12.25 to	13.00
cent and under		20.00
Couplers and knuckles	17.00 to	17.50
Rolled steel wheels	17.00 to	17.50
No. 1 blast furnace scrap Machine shop turnings (for roll-		11.00
Wrought iron and soft steel pipes	12.00 to	
and tubes (new specifications)	13.50 to	14.00
Shafting	18.50 to	19.00
	21.00 to	22.00
No. 1 forge fire	12.00 to	12.50
Steel rails for rolling	16.50 to	17.00
Cast iron carwheels		16.50
		17.50
		16.50

Pittsburgh Iron and Steel Market

(Concluded from page 888)

with \$2.30, base Pittsburgh, the recent ruling price, which, however, was not as low as has been done on a few attractive railroad specifications. The new base price, therefore, means an advance of \$9 a ton, and while this is largely reduced in some instances through a downward revision of extras, the general cost to buyers is increased. The base diameters in the new card are % in. to % in., compared with % in. to 1% in. in the old one, and a charge is set up for 1-in. of 5c. per 100 lb., and of 15c. for 1%-in. On the other hand, the old diameter extra of 75c. per 100 lb. for ½-in. is cut to 35c. in the new card, and the new extra for %-in. is 15c. in place of 35c. in the former schedule. The new net price of ½-in. rivets is increased \$1 a ton, but on 11/8-in. diameter there is the full advance in the base price, plus the \$3 per ton extra for size, or an increase of \$12 per ton. No change has been made in small rivets. The new bolt and nut schedules are be-No change has been made in ing studied, and advance business seems to wait on buyers becoming acquainted with them.

Employment Gains in Illinois

Employment in Illinois has increased following a four-month decline, according to a statement issued by the Illinois Department of Industrial Accident and Labor Research. From last October and continuing into February there was a total decline of 5.1 per cent in the number of workers on the pay-rolls of factories. The recent increase reported is 6 per cent.

To Test Stainless Steel Rifle Barrels

WASHINGTON, March 22.—The Springfield, Mass., armory has been given orders to conduct erosion tests using one shoulder-rifle barrel of stainless steel supplied by each of the five manufacturers, together with one barrel made of standard material. The experimental manufacture of rifle, machine gun and pistol barrels from various types of stainless steel is being continued at the armory. The machinability of that steel is declared to be the most difficult problem of solution in the project.

Engineering courses for the summer session are being planned by the Carnegie Institute of Technology. Pittsburgh. They are outlined to appeal to men already engaged in engineering work, as well as undergraduates. Courses of six and eight weeks will be given, beginning June 13. Both theoretical class room instruction and shop practice will be covered.

San Francisco

Los Angeles Buys 6200 Tons of Belgian Cast Iron Pipe-English Coke Arrives

SAN FRANCISCO, March 19 (By Air Mail) .- Outstanding developments of the week include a letting by the city of Los Angeles of 6200 tons of cast iron pipe, which was taken by the Grinnell Co. of the Paagent for Belgian makers, the arrival at this port of 4000 tons of English coke and 500 tons of Indian foundry iron, and heavier buying in plates, shapes and reinforcing bars.

Two referendums on bond issues will be held in San Francisco the latter part of May or early in June. The first referendum will be to decide on proposals for issuing \$38,000,000 worth of bonds for the purchase of the Spring Valley Water Co. The second will be to decide bond issues on seven proposed extensions to the municipal railroad system and on the proposed construction of a war memorial, a new Hall of Justice and

other municipal projects.

Pig Iron.—Of special interest this week was the arrival of 500 tons of Indian foundry iron. It is understood that the principal importer of Indian iron, at the end of this month, will have completed delivery of a total of 5000 tons of Indian iron to users in the San Francisco and Los Angeles districts. Indian foundry iron are unchanged, as it is understood that importers, temporarily, will absorb the new tariff duty. Bookings for the second quarter in both domestic and foreign irons are substantial.

Prices per gross ton at San Francisco:

*Utah basic \$25.00 to \$26.00 to \$10.00 to \$25.00 to \$26.00 to \$26.00 to \$26.00 to \$26.00 to \$10.00 foundry, sil. 2.75 to \$25.00 to \$26.00 to \$10.00 foundry, sil. 2.75 to \$25.00 to \$26.00 to \$26.00 to \$10.00 to \$10.00 foundry, sil. 2.75 to \$25.00 to \$26.00 to \$26.00 to \$26.00 to \$26.00 to \$10.00 to \$10.00

*Delivered San Francisco. **Duty paid, f.o.b. cars San Francisco.

Shapes .- Lettings for the week total 2225 tons, and fresh inquiries call for about 1424 tons. The largest individual award, 1100 tons, for a theater in Portland, Ore., was taken by Poole & McGonigle of that city. Bids have closed on 1224 tons for a warehouse and garage also in Portland. Over 500 tons in small-tonnage jobs was placed during the week with local fabricators. Eastern mills continue to quote plain material at 2.35c., c.i.f. Coast ports.

Plates.—Of special interest this week is the announcement by the city of Long Beach, Cal., that it will call for bids in the near future on 3500 tons for a gas holder of 10,000,000 cu. ft. capacity. The largest individual letting of the week, 500 tons of plates and shapes for a dredge for the Hawaiian Islands Dredging Co., Honolulu, T. H., was taken by the Pacific Coast Engineering Co., Oakland, Cal. There is a good deal of plate work pending, but most of the jobs that have been placed recently have been for relatively small ton-While there has been no actual strengthening nages. in mill quotations, nothing under 2.25c., c.i.f. Coast ports, is known to have been done during the week. On small tonnages 2.30c. is general.

Bars.-Lettings of reinforcing bars for the week total about 1100 tons, but no fresh inquiries of importance have come up for bids. The largest individual letting of the week, 500 tons for an apartment house in Los Angeles, was placed locally. Local reinforcing bar jobbers quote as follows: 2.85c., base, per lb. on lots of 200 tons, and 3.10c., base, on less-than-carload

Cast Iron Pipe.—The largest individual letting of the year in cast iron pipe, 6200 tons for the city of Los

Angeles, has been taken by the Grinnell Co. of the Pacific, local agent for Belgian makers. The American Cast Iron Pipe Co. took 282 tons for the improvement of Dolphin Place for the city of San Diego, Cal. 560 tons required for the improvement of Lemon Grove Boulevard, San Diego, was placed with an unnamed maker. B. Nicoll & Co., local agents for French mak-ers, have taken 250 tons as follows: 119 tons for El Cerrito Drive, San Diego; 55 tons for El Cajon Drive, San Diego, and 56 tons for the city of Burbank, Cal. Fresh inquiries include the following: Barnes City, Fresh inquiries include the following: Cal., 325 tons of 6 and 8-in. Class D pipe; Beverly Hills, Cal., 125 tons to 188 tons of 16-in. Class B pipe; San Diego, 109 tons of 4 and 6-in. Class B and 4-in. Class C pipe. On the first two of these projects bids are being taken; on the third, bids will be taken April 4.

Warehouse Business.—Inquiries are fairly numerous, but orders for the most part are light. Quotations are unchanged.

Coke.—For the first time in nearly a year, i. e., since the English coal strike started, a shipment of 4000 tons of English coke arrived at this port. Other shipments are en route. Local importers quote on specific inquiries only. However, English coke is quoted at about \$4 a ton higher than German fuel.

Birmingham

Steel Output Heavy-Pig Iron Buyers Still Defer Second Quarter Purchases

BIRMINGHAM, March 22.-Melters of pig iron in the South have not yet purchased against their needs for the second quarter, but furnace interests have opened their books for that period at \$18, Birmingham, for No. 2 foundry, the same price that has ruled for some time. The larger part of the foundry iron sold during the past several weeks has consisted of small lots. The next quarter will begin with sufficient business, however, to sustain blast furnace operations at the present rate. There have been no additions to the surplus stock of foundry iron or furnace banks, and shipments in the last 10 days of the month will be in good volume. Many consumers are looking forward to continued business activity, and in several instances orders in hand will require the purchase of a considerable tonnage of iron. The impending strike in the coal fields of the Central States has failed to prove a market stimulus in pig iron, steel, coal or coke in this district. Jobbing foun-dries report some improvement in operations through diversification. One of the larger shops is running full on gasoline pumps, automobile lifts and cotton presses.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry.	1.75	to	2.25	sil.	 			.\$18.00
No. 1 foundry,	2.25	to	2.75	sil.	 		 	. 18.50
Basic								
Charcoal, warr	n bla	ast			 		 	. 29.00

Rolled Steel.-Virtually all open-hearth furnaces are in operation and most of the finishing mills are producing steadily without adding to stocks. The rail mill and railroad accessory shops are running at full tilt, while wire and nails, sheets and structural steel are moving well also. The demand for tanks is recovering, and as a consequence business in plates has improved. Steel fabricating shops are considerably more active than they were a few weeks ago, and prospects are brighter in this direction than at any time so far this year. Railroads are expected to reenter the market for cars. Mill prices show no change.

Cast Iron Pipe.—In pressure pipe, activity is now in sight for several months to come. The second quarter holds out bright prospects, and production is being speeded up. Pipe makers have some raw material on their yards, but not sufficient for all requirements. Quotations on pressure pipe are firm at \$36 to \$37 per net ton, Birmingham, for 6-in. and larger diameters

Coke.—Practically all the by-product ovens in this district are in operation, and independent producers are shipping their product steadily. The market is firm, although not considered strong. So long as there is no piling of coke the situation will be regarded as satisfac-

Warehouse Prices, f.o.h. San Francisco

Base per Lb.	
Plates and structural shapes 3.00c.	
Soft steel bars 3.00c.	
Small angles, 16-in. and over 3.00c.	
Small angles, under &-in 3.40c.	
Small channels and tees, %-in. to 2%-in. 3.60c.	
Spring steel, 4-in, and thicker 5.00c.	
Black sheets (No. 24) 4.70c.	
Common wire nails, base per keg \$3.75	
Cement coated nails, 100-lb. keg 3.75	
Blue annealed sheets (No. 10) 3.75c.	
Galvanized sheets (No. 24) 5.25c	

tory. Prices on foundry coke remain at \$5.50 per net ton, Birmingham, for by-product fuel and at \$6 for beehive, with the output of the latter not of great consequence. No increase in the demand for coke is looked for here as a result of the proposed strike in the Central States. Coal production in Alabama is still around 400,000 tons a week. This can be increased by at least 50,000 tons a week, and possibly more, if the railroads provide sufficient cars.

Old Material.—Heavy melting steel and No. 1 cast are the only grades on the list for which there is any demand whatever. Dealers have been buying railroad scrap and are maintaining strong forces on their yards, delivering material as consumers release shipping orders. Prices are unchanged.

Prices per gross ton, delivered Birmingham district

onsumers yaras:	
Heavy melting steel	\$12.00 to \$12.25
Railroad wrought	11.00 to 12.00
Steel rails	
Machine shop turnings	8.00 to 8.50
Cast iron borings	
Steel axles	
Iron axles	
No. 1 cast	15.00 to 16.00
Tramcar wheels	15.00 to 16.00
Carwheels	
Stove plate	13.00 to 14.00
Cast iron borings, chemical	
Rails for rolling	15.00 to 16.00

Youngstown

Operations Exceed 82 Per Cent—March Shipments Heavy

Youngstown, March 22.—New business continues to engage Mahoning Valley rolling mills in excess of 82 per cent of capacity. This week, for example, 45 of 53 independent open-hearth furnaces and 110 of 127 sheet mills are active. The Youngstown Sheet & Tube Co. is operating eight of 15 pipe mills in this district and is otherwise occupied at 70 to 75 per cent. The Republic Iron & Steel Co. is maintaining operations at 80 per cent.

Buttweld pipe business is slack, as reflected in weak operations by mills rolling the smaller-size tubes. There has likewise been a decline in the larger-size tubes, though lapweld capacity is well engaged at the present time. While rolling mills are occupied at a high rate, much of the current buying, especially for the so-called flat products, is of the hand-to-mouth variety. In sheets, full-finished automobile body stock exhibits the most strength at present, with mills having a comfortable backlog and occupied at a high rate. This week the Waddell Steel Co. resumed with six mills, following a one week's suspension.

Fabricating interests catering to the building trades say that a considerable volume of new business is developing from all parts of the country. Plate producers have a fair-sized backlog at this time, much of this tonnage going into storage tanks for southwestern

oil companies.

Virtually all of the tonnage produced by the jobbing mill at the Mosier plant of the Sheet & Tube company is now going to the Youngstown Steel Door Co., whose product is fabricated by the Midland Products Co., Cleveland. This mill was converted into a jobbing unit from the 84-in. plate mill originally installed, and is a continuous mill. Steel doors for most of the new freight cars ordered this year are being supplied by the Youngstown Steel Door Co., which is owned by President James A. Campbell of the Sheet & Tube company and associates. It is planned to build later a plant in the Youngstown area, likely this year.

Takes Order Over Transatlantic Telephone

The McKay Machine Co., this city, last week secured a substantial order from Burton, Griffiths & Co., Ltd., London, England, via long distance telephone. This was the first telephone order of the kind received in the Valley. It required 40 min. to make the connection. Officials say the transaction was concluded in a satisfactory manner.

March shipments of finished steel by Valley industries will likely exceed figures for the two preceding

months this year.

Toronto

Good Volume of Pig Iron Buying Develops—Scrap More Active

Toronto, Ont., March 22.—With the beginning of the second quarter only a few days off, melters are now showing more interest in the pig iron market. A number of contracts were closed during the week by melters for requirements up to the end of June, and, according to inquiries appearing, it is believed that sales for the second quarter will reach a comparatively high level. A stronger demand for foundry and malleable iron for spot delivery also has developed during the past few days. Consuming industries are operating on a more extensive scale than formerly with a consequent increase in melt. Since the first of this month the production of pig iron in Canada has increased by approximately 300 tons per day, and six blast furnaces are now active in this country, out of a total of 15.

Summerlee 26.00
Carron 36.00
Old Material.—As a consequence of better conditions featuring the iron and steel industry of this country, dealers report a stronger demand for scrap. Orders closed during the past few days have increased both in number and in tonnages. Business in scrap, however, is still far from satisfactory. The demand is chiefly confined to the immediate needs of consumers, with an occasional contract appearing from some of the larger buyers. In the Montreal district dealers report little interest in the market on the part of consumers, practically all of whom are buying for immediate needs. At Montreal also there is a relatively small movement of scrap for export. The early breakup of winter has made large scrap holdings available and dealers are experiencing no difficulty in adding to their supplies.

Dealers' buying prices:	Toronto	Montreal
Per Gross To	992	
Heavy melting steel	11.00 11.00 7.00 8.00 8.50 8.50 8.00 6.00	\$9.00 10.00 14.00 7.50 8.00 8.50 7.50 8.00 6.00 17.00
Per Net To		20.00
No. 1 machinery cast Stove plate Standard carwheels Malleable scrap	16.00 10.00 14.00	18.00 13.00 16.00 14.00

Buffalo

Higher Quotations on Pig Iron—Large Purchase of Scrap

BUFFALO, March 22.—Although there has been relatively little pig iron buying in the past week, it is understood the Worthington Pump & Machinery Corporation has placed 2000 tons and that the Ingersoll-Rand

Warehouse Prices, f.o.b. Buffalo

	Bas	e per Li
Plates and structural shapes		3.40c.
Soft steel bars		3.30c.
Cold-finished shapes		4.45c.
Rounds		3.95c.
Black sheets (No. 24)		4.30C.
Galvanized sheets (No. 24)		5.15c.
Blue annealed sheets (No. 10)		3.80c.
Common wire nails, base per keg Black wire, base per 100 lb		\$3.90
Triends are of menon ber you in		

Co. has purchased about 2000 tons of foundry for Phillipsburg, N. J. A 1000-ton lot of malleable was sold in this district. Three producers are firm on an \$18 base and have been able to book a fair number of 100 to 300-ton lots on that basis. For No. 2X, these makers have obtained \$18.50, furnace, and for No. 1X, \$19.50. One of these furnaces also sold a carload of 3.25 to 3.75 per cent silicon foundry at \$20.50, furnace. On the other hand, another Buffalo maker is reported to have sold No. 1X at \$17.50 for any delivery.

Prices per gross ton, f.o.b. Buffalo:

No. 2 plain fdy., sil. 1.75 to 2.25. \$17.00 to \$18.00

No. 2X foundry, sil. 2.25 to 2.75. 17.50 to 18.50

No. 1X foundry, sil. 2.75 to 3.25. 18.00 to 19.50

Malleable, sil. up to 2.25. 17.00 to 18.00

Basic 17.00 to 18.00

Lake Superior charcoal 27.28

Finished Iron and Steel.—The bar market continues to improve, and price continues firm. Sheet prices show a firmer tone, and the volume of inquiry and specifications is good. The Seneca Iron & Steel Co. is now operating its sheet mills at 85 per cent of capacity. Inquiry for sheets covers a wide range, with automobile, stove and metal furniture sheets all moving well. The reinforcing bar market is active, with 175 tons for a plant addition placed during the week and with bids out for a 10-story building calling for 300 tons. One contractor estimates that about \$2,000,000 worth of new building work came out in the Buffalo district last week.

Old Material.—Considerable buying has been done over the past week, one consumer having purchased approximately 15,000 tons of heavy melting steel and No. 1 busheling. The steel, which was No. 1, was bought at \$15.75 to \$16 and the No. 1 busheling, at \$14.75 to \$15. The largest consumer has been buying direct from railroads large lots of heavy melting steel, paying about \$17.50 per gross ton, delivered, but this company is offering dealers only about \$15.50. The movement of specialties continues, with the regularly quoted prices being paid. The out-of-town market is much stronger, with inquiries coming in from out-of-town dealers. Malleable has been active at \$17 to \$17.50, with several small sales at that figure. Rails are very scarce. Pittsburgh market activity in turnings is having some effect here.

 Prices per gross ton, f.o.b. Buffalo:

 Heavy melting steel
 \$15.00 to \$15.50

 Selected No. I heavy melting steel
 16.00 to 16.50

 Hydraulic compressed sheets
 14.00 to 14.50

 Hand bundled sheets
 10.50 to 11.50

 No. 1 railroad wrought
 13.00 to 13.50

 Machine shop turnings
 9.00 to 9.50

 Drop forge flashings
 13.00 to 13.50

 Low phosphorus
 17.50 to 18.00

 Mixed borings and turnings
 10.00 to 10.50

 Cast iron borings
 14.75 to 15.00

 Iron axles
 24.00 to 25.00

 Steel axles
 16.00 to 16.50

 No. 1 machinery cast
 16.75 to 17.25

 Stove plate
 14.75 to 14.75

 Grate bars
 12.00 to 13.00

 Cast iron carwheels
 16.00 to 16.50

 Railroad malleable
 16.50 to 17.00

St. Louis

Steel Output of Local Mill Increased to 94 Per Cent—Pig Iron Lower

St. Louis, March 22.—Sales of pig iron by the local maker during the last week amounted to approximately

Warehouse Prices, f.o.b. St. Louis

THE CHOUSE I LICES, LICES, De LOUIS
Base per Lb.
Plates and structural shapes. 3.25c. Bars, soft steel or iron. 3.15c. Cold-finished rounds, shafting and screw stock. 3.75c. Black sheets (No. 24) 4.45c. Galvanized sheets (No. 24) 5.25c. Blue annealed sheets (No. 10) 3.60c. Black corrugated sheets. 4.65c. Galvanized corrugated sheets 5.30c. Structural rivets 3.65c. Boiler rivets 3.85c.
Tank rivets, %-in, and smaller

18,000 tons, continuing the buying movement which began four weeks ago. Of the week's sales, foundries in the St. Louis industrial district took 12,000 tons, half of which went to one melter while the remainder comprised lots of from 1000 to 2000 tons. Sales outside of the district were to consumers in Iowa, Missouri and Illinois. It is understood that there is still considerable buying to be done for second quarter delivery. Some of the steel works are said to be delaying buying pig iron on account of the weakness shown in scrap prices. Granite City foundry iron is now quoted at \$20.50 to \$21, base furnace, or 50c. below recent prices.

 Prices per gross ton at St. Louis:

 *No. 2 fdy., sil. 1.75 to 2.25, f.o.b.

 Granite City, III.

 Northern No. 2 fdy., delivered

 St. Louis
 22.16

 Southern No. 2 fdy., del'd
 22.16

 Northern malleable, delivered
 22.16

 Northern basic, delivered
 22.16

*Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—The movement of domestic sizes of coke has slowed down further because of the mild weather. Consumers continue to buy industrial grades in anticipation of a coal strike.

Finished Iron and Steel.—The National Enameling & Stamping Co. lighted another open-hearth furnace last Wednesday night. This brings operations up to 94 per cent of rated ingot capacity, evidencing heavier bookings. Eastern mill representatives also report that orders in this territory are coming in more freely. Prices are firmer. Warehouse business continues light, but better conditions are expected after April 1. Jobbers are expected shortly to issue new list prices on bolts and nuts, conforming to the action of the Buffalo Bolt Co. and other manufacturers. Business continues dull with fabricators of structural steel, although some large municipal projects are expected to be considered soon.

Old Material.—An East Side consumer has asked for shipments against contracts of wrought iron bars and transoms, which has caused dealers who are short to raise the price they are willing to pay 50c. a ton. Except for this item, the old material market is dead. Consumers say that they have no orders and will not buy, which is echoed by the dealers, who decline to speculate. Railroad lists include: Nickel Plate, 4100 tons of relaying and melting rails; Texas & Pacific, 900 tons; St. Louis-San Francisco and Chicago, Milwaukee & St. Paul, 700 tons each; Chicago & Alton and Monon, 600 tons each, and Missouri Pacific, 200 tons.

Prices f.o.b. dealers' yards and delivered St. Louis district consumers' yards:

Per Gross Ton

Heavy melting steel	512.00 to	\$12.00	
Heavy shoveling steel			
Frogs, switches and guards cut			
apart	13.00 to	13.50	
Steel rails less than 3 ft	16.00 to	16.50	
Iron rails	14.00 to	14.50	
Heavy axle and tire turnings	9.50 to	10.00	
Railroad springs	14.00 to	14.50	
No. 1 locomotive tires	16.75 to	17.25	
Rails for rolling	14.50 to		
Relaying rails, 60 lb. and under	20.50 to		
Relaying rails, 70 lb. and over	26.50 to		
Cast iron carwheels	14.25 to	14.75	
Per Net Ton			
Machine shop turnings	6.25 to	6.75	
Bundled sheets	7.50 to		
Cast iron borings	8.50 to		
Steel angle bars	12.50 to		
Steel car axles	17.25 to		
Iron car axles	20.50 to		
Wrought iron bars and transoms			
No. 1 railroad wrought	10.75 to		
No. 2 railroad wrought	10.75 to		
No. 1 busheling			
No. 1 machinery cast			
	14.25 to		
Railroad malleable	12.00 to	12.50	

Awards amounting to \$48,400 were paid to 4405 employees of the General Electric Co. during 1926 for suggestions which either improved working conditions or tended to increase the efficiency of the company's operations. During the year 13,703 suggestions were offered, an increase of 2500 over the previous year and more than 32 per cent were accepted. The awards ranged up to \$1,000 and averaged \$11 per person.

Cincinnati

Pig Iron Mart Still Highly Competitive—Heavy Melting Up 50c

CINCINNATI, March 22.—Despite the fact that Lake Erie furnaces have advanced their quotations in the past two weeks, desirable tonnages are being taken by local brokers at low prices, Cleveland producers are understood to be holding to a minimum of \$18.50, base furnace, but Cincinnati pig iron houses have submitted bids of \$18, base Cleveland, on at least two sizable inquiries. A central Ohio seller also has figured prominently in recent business, with quotations ranging from \$18.50 to \$19.50, base furnace. Meanwhile, companies in the Ironton district have been unable to book many orders in the face of severe competition from the central and northern parts of the State. In fact, their market on the basis of \$20, Ironton, is so circumscribed that they are confronted with the problem of lowering their prices or shutting down their furnaces until the situation becomes more favorable. That the latter policy will be adopted by one of the furnaces is the report given credence in local circles. The silvery market shows greater activity, numerous small sales having been made. Southern iron for second quarter delivery is moving more freely at \$18, base Birmingham. The Western Gas Construction Co. Fort Wayne, Ind., is expected to buy 600 tons of foundry iron, while the Louis-ville & Nashville has not yet closed for approximately 550 tons of foundry and charcoal iron. The American Rolling Mill Co. is reported to be reconditioning its Norton furnace at Ashland, Ky., recently acquired, pre-paratory to making basic iron. The Ford Motor Co., Detroit, is in the market for 1000 tons of ferromanganese to cover second quarter requirements.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25\$21.	39 to \$21.89
So. Ohio malleable 20.	
Alabama fdy., sil. 1.75 to 2.25	21.69
Alabama fdy., sil. 2.25 to 2.75	22.19
Tennessee fdy., sil. 1.75 to 2.25	21.69
Southern Ohio silvery & ner cent	30.39

Freight rates: \$1.89 from Ironton and Jackson. Chio; \$3.69 from Birmingham.

Finished Material.-Further betterment in the sheet market and increased specifications and orders for coldrolled products from automotive parts manufacturers are the outstanding developments in the past week. A large sheet producer nearby reports that bookings dur-March have been in excess of capacity, and other mills also have been successful in building up order books. Specifications of automobile manufacturers against first quarter contracts have been substantial. A slight improvement in the demand for electrical sheets also adds an encouraging note. Despite the ten-dency toward growing strength, however, sheets have not yet been stabilized on a satisfactory price basis. Galvanized sheets are fairly firm at 3.75c., base Pittsburgh, but lower quotations continue to appear in isolated cases. Blue annealed stock is being sold at 2.20c., base Pittsburgh, with some makers refusing to take business under 2.30c. The movement of black sheets at 2.85c. to 2.90c., base Pittsburgh, is somewhat larger. In certain instances sellers are talking about higher prices for second quarter, but the general belief is that the present schedule must be more firmly established

Warehouse Prices, f.o.b. Cincinnati

warehouse Frices, 1.o.b. Cincinnati
Base per Lb.
Plates and structural shapes 3.40c. Bars, soft steel or iron 3.30c. Reinforcing bars 3.30c. Hoops 4.00c. to 4.25c. Bands 3.95c.
Cold-finished rounds and hexagons 3.85c. Squares 4.35c. Open-hearth spring steel 4.75c. to 5.00c. Black sheets (No. 24) 4.95c. Galvanized sheets (No. 24) 4.90c. Blue annealed sheets (No. 10) 3.60c. Structural rivets 3.75c.
Small rivets
Lap welded steel boiler tubes, 2-in. \$18.00 4-in. \$8.00 Seamless steel boiler tubes, 2-in. 19.00 4-in. 39.00

before an advance can be put into effect. Structural steel and bars continue at 1.90c., base Pittsburgh. Sales have been fairly good. Purchases of wire products have been rather light, and common wire nails are being delivered in Cincinnati by an independent producer at about \$2.72 per keg. Other mills, however, are adhering to \$2.55, base Pittsburgh. Electrical wire has been the subject of keen competition, and prices have suffered as a result. Fabricators are booking a moderate number of small jobs, but large projects are scarce.

Reinforcing Bars.—New buildings at the Cincinnati stockyards will take about 1000 tons of bars instead of 500 tons, as reported a week ago. Aside from this one important pending job, the market is exceedingly dull. Prices are rather weak, with new billet bars quoted nominally at 1.90c., base Pittsburgh, and rail steel bars at 1.80c. to 1.85c., base mill.

Warehouse Business.—While sales have increased slightly in the past week, jobbers are finding it difficult to maintain bookings on the basis that usually prevails during March. Several companies report that total husiness to date this year is about 15 per cent below that in the same period in 1926. Structural steel is the outstanding product in demand. Prices are firm and unchanged.

Coke.—The market is fairly steady at current prices, and there have been no developments in the past week to indicate that the impending coal strike will seriously disturb conditions unless a suspension of coal mining in union districts should continue for more than 90 days. One large by-product coke company has assured its customers that its supply of coking coal is ample to meet any emergency that might arise in the next few months. On the other hand, beehive coke from the Wise County and New River territories is showing strength, and many consumers have been accumulating sizable stocks in anticipation of difficulty in securing prompt deliveries and of having to pay higher prices after April 1. Dealers estimate that the consumption of by-product domestic coke in the past 12 months has been about 25 per cent less than in the previous year. A drop of at least \$1 a ton in domestic grades is looked for April 1.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, \$9.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—Heavy melting steel is up 50c. a ton, and a number of other items are stronger. The Chesapeake & Ohio is reported to have received good prices for its items offered last week. Mills in this district are taking a normal amount of material on contract. Because of curtailed foundry operations, foundry grades are somewhat sluggish.

Dealers' buying prices, f.o.b. cars, Cincinnati

)	ealers' buying prices, f.o.b. cars, Cincinnati:	
	Per Gross Ton	
	Heavy melting steel	00 00 50 50 00
	Per Net Ton	.00
	Cast iron borings 8.00 to Machine shop turnings 7.50 to No. 1 machinery cast 16.00 to No. 1 railroad cast 13.00 to 13 ron axles 19.50 to No. 1 railroad wrought 9.00 to Pipes and flues 7.50 to No. 1 busheling 9.00 to Mixed borings 6.50 to Burnt cast 7.00 to Stove plate 9.00 to 9 00 to 9	.50 .00 .50 .50 .50 .50 .50

New Switching Rates at Chicago

April 30 has been set as the tentative date on which a revised tariff of switching rates on iron and steel will become effective in the Chicago district. The new rates will be 3c. per 100 lb. for a one-road haul, 3½c. for a two-road haul and 4c. for hauls over more than two lines. The new schedule will supersede the present rate of 2c., 2½c. and 3c. respectively.

Boston

Pig Iron Prices Firmer but Buying Has Dropped to Small Proportions

Boston, March 22.—Two furnaces east of Buffalo last week sold a total of about 3500 tons of pig iron. Aggregate sales for the territory fell considerably short of the 5000-ton mark. It is apparent that New England foundries on this pig iron buying movement, which is drawing to a close, bought largely on speculation. The melt of iron in this territory is decreasing rather than increasing, particularly in the jobbing foundry division, and more foundries are being offered for than at any period since long before the war. With the tapering off in business, the market appears firmer. The lowest price at which No. 2X Buffalo iron can be bought today is \$17.75 a ton, furnace, making the base price \$17.25, contrasted with \$17 a week ago and a recent low of \$16.50. Most Buffalo furnaces are quoting \$18 a ton. Furnaces east of Buffalo are taking a firmer stand on prices in sympathy with the Buffalo Although eastern Pennsylvania furnaces iron market. openly quote \$21 a ton, base furnace, \$20.50 still can be done. Alabama iron is pegged at \$18 a ton, furnace.

Prices of foundry iron per gross ton, delivered to

7	OG0 74 CON 75105	harmen bo	P1000.		
	East. Penn.,				
	East. Penn.,	sil. 2.25	to 2.75.	 24.65 to	25.15
	Buffalo, sil.	1.75 to	2.25	 22.16 to	22.91
	Buffalo, sil.	2.25 to	2.75	 22.66 to	22.91
	Virginia, sil.				
	Virginia, sil.	2.25 to	2.75	 27.42 to	27.92
	Alabama, sil	. 1.75 to	2.25	 24.91 to	26.77
	Alabama, sil	. 2.25 to	2.75	 25.41 to	27.27

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.92 from Virginia, \$6.91 to \$8.77 from Alabama.

Coke.-With a possible coal strike only a few days ahead, New England foundries still refuse to be alarmed Specifications against first the fuel situation. half contracts for by-product foundry coke are smaller than a week ago and much lighter than a year ago. Fuel is being taken only as required. The New England Coal & Coke Co. and the Providence Gas Co. quote by-product foundry coke at \$12.50 a ton, delivered within a \$3.10 freight rate zone. There has been a sharp slump in demand for domestic fuel since the advent of spring weather a week ago.

Finished Material.—Bids have closed on 750 tons of tank plates, smaller tonnages of floor plates, boiler plates and angles, and on 130 tons of shapes required by Boston. Mill bookings in bars, shapes, plates and other steel products have been fair so far this month, but specifications against old contracts are somewhat disappointing. The market on standard shapes is 1.85c. to 1.90c. per lb., base Pittsburgh. Fabricators are getting some small jobs, but few important ones, and are beginning to catch up on work in hand. Local dealers quote 2.90c. per lb., base, for reinforcing bars, but that price is being shaded even on small tonnages.

Cast Iron Pipe.—Quincy, Mass., has awarded 125 tons of 8 and 12-in. pipe to the Warren Foundry & Pipe Co., Swampscott, Mass., has closed bids on 250 tons of 6 and 8-in. pipe, and Everett, Mass., on March 24 closes bids on its 1927 requirements, amounting to about in price in sympathy with the Pittsburgh market. Business, however, is still light, although offerings are being made more freely than heretofore. The average range of prices on long bundles of skeleton is \$7 to \$7.50 a ton on cars, but some business is being put through at \$6.85. Blast furnace borings and turnings are less active because the Mystic Iron Works has withdrawn from the market. There is a good demand for chemical borings both from chemical plants and from gas companies. Short bundles of cotton ties are of-

350 tons of 6 to 12-in. pipe. Prices quoted openly on domestic pipe are: 4-in., \$58.10, delivered common Boston freight rate points; 6 to 12-in., \$53.10 to \$54.10; larger pipe, \$52.10 to \$53.10. A \$5 differential is asked

Old Material.—Material for steel mill use is firmer

on Class A and gas pipe.

fered at \$7.50 a ton, with few takers. The machinery cast market is easier, owing to the continued lack of business. The average range of prices on No. 1 machinery cast is \$16.50 to \$17 a ton, delivered, but one Connecticut foundry has just bought a tonnage at \$16. There is practically no market for stove plate and railroad malleable.

Buying prices per gross ton, f.o.b. Boston rate ship-

pring points.	
No. 1 heavy melting steel\$10.50 to \$11.00 Scrap rails	
No. 1 railroad wrought 12.00 to 12.50	
No. 1 yard wrought 11.00 to 11.50	
Machine shop turnings 6.75 to 7.25	
Cast iron borings (steel works	
and rolling mill) 6.85 to 7.50	
Bundled skeleton, long 6.85 to 7.50	
Forged flashings 7.50 to 8.00	
Blast furnace borings and turn-	
ings 6.00 to 6.50	
Forged scrap 7.50 to 8.00	
Shafting 14.50 to 15.00	
Street car axles 15.00 to 15.50	
Wrought pipe (1 in. in diameter,	
over 2 ft. long) 8.50 to 9.00	
Rails for rerolling 11.00 to 11.50	
Cast iron borings, chemical 10.50 to 11.25	
Prices per gross ton, delivered consumers' yards:	
Textile cast\$17.00 to \$17.50	
No. 1 machinery east 16.50 to 17.00	
No. 2 machinery cast 15.00 to 15.50	
Stove plate	
Railroad malleable 16.00 to 16.50	

Detroit Scrap Market Firmer

DETROIT, March 22 .- While there has been an added note of firmness during the past two weeks in the market on old material, definite advances have not since the first of the month, so that the total production will be even higher than anticipated the latter part of February. Prices are unchanged from two weeks ago.

	Per Gross Ton
Heavy melting and shoveling	\$13.00 to \$13.50
Borings and short turnings	8.50 to 9.00
Long turnings	7.50 to 8.00
No. 1 machinery cast	
Automobile cast	
Hydraulic compressed	
Stove plate	13.50 to 14.50
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.25 to 8.75
Flashings	11.25 to 11,75

Propose Rearrangement of Steel Barrel Specifications

Revised specifications for steel barrels and drums have been agreed upon by the Steel Barrel Manufacturers' Association and the Bureau of Explosives and will probably be presented to the Interstate Commerce Commission next month. The plan, which was insti-Commission next month. The plan, which was instituted some time ago by the Bureau of Explosives, is designed primarily to standardize specifications and inconsistencies. There are no important changes in the present specifications, even though a complete rearrangement has been agreed upon in order to facilitate interpretation of the existing code.

Domestic sales of oak leather belting in February are reported by the Leather Belting Exchange at 284,-630 lb., valued at \$480,172, or an average of \$1.69 per lb. There has been a steady reduction for some period, the January figures having been 298,764 lb., valued at \$499,534, or an average of \$1.67 per lb. In February, 1926, the total was 376,460 lb., valued at \$639,607, or an average of \$1.70 per lb.

ton	Bost	f.o.b.	Prices,	arehouse	W
T2-					

Warehouse Prices, f.o.b. Boston	
Bas	se per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams. Tees Zees	3.365c.
Soft steel bars and small shapes Flats, hot-rolled	4.15c.
Iron bars-	
Refined Best refined Norway, rounds Norway, squares and flats	4.60c. 6.60c.
Spring steel—	
Open-hearth 5.00c. to 1 Crucible 4.50c. to 1 Tire steel 4.50c. to 1 Bands 4.015c. to 1 Hoop steel 5.50c. to	12.00c. 4.75c. 5.00c.
Cold rolled steel-	
Rounds and hexagons	4.55c.

FABRICATED STRUCTURAL STEEL

Inquiries Total 80,000 Tons, Including 40,000 Tons for Chicago Warehouse

A 20-story warehouse for Marshall Field & Co., Chicago, to cover three city blocks will require about 40,000 tons, inquiry for which has appeared. Other pending structural business brings the total of new projects within the week to 80,000 tons. Awards of 28,500 tons were as follows:

MILFORD, Mass., 200 tons, theater, to A. L. Smith Iron Works. PROCTOR, VT., 500 tons, Vermont Marble Co., shop, to Lackawanna Construction Co.

New York, 850 tons, apartment building, Seventy-ninth Street and West End Avenue, to Taylor-Fichter Steel Construction Co.

NEW YORK, 650 tons, community house, West End Avenue and 100th Street, to Easton Structural Steel Co.

New York, 3400 tons, widening of Park Avenue, to Taylor-Fichter Steel Construction Co.

NEW YORK, 3000 tons, apartment hotel, Seventh Avenue and Fifty-third Street, to Paterson Bridge Co.

NEW YORK, 2000 tons, housing station and destructor building, city of New York, to McClintic-Marshall Co.

PHILADELPHIA, 200 tons, mill building, to Belmont Iron

PHILADELPHIA, 200 tons, building for Tioga Trust Co., to unnamed fabricator.

MISSOURI-KANSAS-TEXAS LINES, 700 tons, bridge work, to Mount Vernon Bridge Co.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD, 125 tons, bridge

near Fritch, Tex., to Austin Bridge Co., Dallas. BRENTWOOD, L. I., 400 tons, convent, to McClintic-Marshall

Co. VIRGINIAN RAILWAY, 200 tons, bridges, to Virginia Bridge & Iron Co.

READING RAILROAD, 500 tons, bridges, to Bethlehem Steel Co.

BROCKWAY, PA., 150 tons, Brockway Clay Co. addition, to American Bridge Co.

Pittsburgh, 1600 tons, 10 steel barges for Rodgers Sand Co.; order equally divided between Jones & Laughlin Steel Corporation and American Bridge Co.

DETROIT, 2700 tons, exchange building for Michigan Bell Telephone Co., to Russell Wheel & Foundry Co.

Jackson, Mich., 475 tons, exchange building for Michigan Bell Telephone Co., to Whitehead & Kales Co.

FLINT, Mich., 575 tons, exchange building for Michigan Bell Telephone Co., to American Bridge Co.

INDIANAPOLIS, 400 tons, signal bridges for Pennsylvania Railroad, to an unnamed fabricator.

CHICAGO, 1500 tons, City Bank building, to American Bridge

CHICAGO, 250 tons, smoke stack and coal bunkers for the Crawford Avenue station of the Commonwealth Edison Co., to American Bridge Co.

South Chicago, 400 tons, scrap yard craneway for Inter-state Iron & Steel Co., to Worden-Allen Co.

RACINE, Wis., 600 tons, steel for new bascule bridge over Root River, to Wisconsin Bridge & Iron Co.

St. Louis, 150 tons, two barges for United States Engineer's Office, to Nashville Bridge Co.

SEMINOLE, OKLA., 1200 tons, six 55,000-bbl. steel roof tanks for Prairie Oil & Gas Co., to Petroleum Iron Works.

Tulsa, Okla., 400 tons, tanks for Standard Oil Co., to an unnamed fabricator.

Tulsa, Okla., 400 tons, derricks for Carter Oil Co., to Jones & Laughlin Steel Corporation.

PORT ARTHUR, TEX., 2000 tons, oil stills for Texas Co., to Petroleum Iron Works.

Burns, Ore., 600 tons, sawmill, to Minneapolis Steel & Machinery Co.

Medford, Ore., 100 tons, surge tank for California-Oregon Power Co., to Western Pipe & Steel Co.

PORTLAND, ORE., 1100 tons, theater, to Poole & McGonigle,

PORTLAND, 100 tons, Bull Run storage dam, to an unnamed Portland fabricator.

YAKIMA, WASH., 100 tons, three highway bridges for the State Highway Commission, to an unnamed fabricator.

ALAMEDA, CAL., 100 tons, warehouse for California Packing Corporation, to Schrader Iron Works, San Francisco.

STOCKTON, CAL., 100 tons, gas generator for Western States Gas & Electric Co., to Western Pipe & Steel Co.

KALULUI, T. H., 125 tons, Pier No. 2, to Honolulu Iron

HONOLULU, 500 tons, dredge for Hawaiian Dredging Co., to Pacific Coast Engineering Co., Oakland.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

COLUMBUS, OHIO, 1000 tons, King Rogers Arms apartment building

PHILADELPHIA, 2000 tons, office building at Fifteenth and Walnut Streets.

BOSTON, 1600 tons, John Hancock Life Insurance Co. addition, previously reported as 800 tons

Norwood, Mass., 150 tons, memorial building.

HAVERHILL, Mass., 100 tons, theater.

JAMAICA, L. I., 2000 tons, Catholic high school.

JERSEY CITY, N. J., 575 tons, Stanley Theater.

PHILADELPHIA, 200 tons, garage on Walnut Street.

CONNELLSVILLE, PA., 250 tons, office building.

WARE SHOALS, S. C., 800 tons, foundry for Ware Shoals Co.

CHICAGO, 40,000 tons, warehouse for Marshall Field & Co. CHICAGO, 11,000 tons, building for the Daily News, previ-

ously reported as 5000 tons. CHICAGO, 3000 tons, Robey Street bridge.

CHICAGO, 1000 tons, building for the Western Society of En-

CHICAGO, 5000 tons, Medinah Athletic Club.

MINNEAPOLIS, 1400 tons, theater and office building.

ST. Louis, 4000 tons, bridge across the Mississippi River.

TULSA, OKLA., 4000 tons, Phillips office building.

OKLAHOMA CITY, OKLA., 2500 tons, telephone exchange building.

PORTLAND, ORE., 1224 tons, garage and warehouse for Meyer-Frank Co.; bids in. Long Beach, Cal., 3500 tons, 10,000,000-cu. ft. gas holder.

for the city of Long beach; bids to be called soon

OAKLAND, CAL., 100 tons, Lakeview School; bids April 5. SAN FRANCISCO, 100 tons, warehouse for the Holland Co.; bids to be called soon.

RAILROAD EQUIPMENT

Orders for 540 Heavy Freight Cars and 1254 Mine Cars

Railroad buying of freight cars was comparatively light during the week, amounting to 540 cars, of which 300 were ordered by the Denver & Rio Grande Western and 200 by the Northern Pacific. The H. C. Frick Coke Co. bought 1254 mine cars.

Freight cars in need of repair on March 1 totaled 138,292, or 6.1 per cent of the number on line, according to reports filed with the Car Service Division, American Railway Association. This was an increase of 2236 over the number reported on Feb. 15. On March 1 there were 9548 locomotives in need of repair, a decrease of 318 as compared with the Feb. 15 report. Details of the week's equipment business follow:

The Wabash has placed orders for 42 passenger cars, 24 of which will be built by the American Car & Foundry Co., 12 by the Pullman Car & Mfg. Corporation, and 6 by the St. Louis Car Co.

The Northern Pacific has ordered 200 ballast cars from the Rodger Ballast Car Co. which will be built in the shops of the American Car & Foundry Co.

The New York Central has ordered two motor-rail cars

from the American Car & Foundry Co.

The New York, New Haven & Hartford has ordered 20

air-dump cars from the Clark Car Co.

The H. C. Frick Coke Co. has ordered 1254 mine cars, of which 854 will be built in the shops of the Lorain Steel Co. and 200 each have been awarded to the Watt Car & Wheel Co. and the Phillips Mine & Mill Supply Co.

The Great Northern has bought 500 steel underframes for freight cars from the Pressed Steel Car Co.

The Pere Marquette has given an order for 20 30-yd. air-dump cars to the Pressed Steel Car Co.

The Minneapolis, St. Paul & Sault Ste. Marie ordered

84 caboose car underframes from the Standard Steel Car Co. The Denver & Rio Grande Western has ordered 300 automobile cars from the Mount Vernon Car & Mig. Co.

The Chicago & North Western has ordered an oil electric locomotive from the Ingersoll Rand Co.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound Early Delivery

	Mar. 22	Mar. 21	Mar. 19	Mar. 18	Mar. 17	Mar. 16	
Lake copper, New York	13.50	13.50	13.50	13.50	13.50	13.50	
Electrolytic copper, N. Y.*	13.12 1/2	13.12 1/2	13.121/2	13.121/2			
Straits tin, spot, New York.				68.75	69.12 1/2	69.30	
Lead, New York		7.65	7.65	7.65	7.65	7.65	
Lead, St. Louis	7.30	7.30	7.40	7.40	7.40	7.40	
Zinc, New York	7.00	7.00 6.65	7.021/2		7.05	7.05	
Zinc, St. Louis	6.65	6.00	6.67 1/2	6.70	6.70	6.70	

*Refinery quotation; delivered price 4c. higher.

NEW YORK, March 22 .- The decided quietness, which has characterized nearly all the markets most of the time, continued during the past week. The copper market is almost stagnant but firm. Tin has been fairly active with prices a little lower. Conditions in lead have remained unchanged and a little weakness in quotations has developed in zinc with buying very light.

Copper.-Stagnation in buying is one of the main features in the present situation, which is somewhat peculiar in several respects. Sellers report almost no inquiry from domestic consumers and yet, in spite of this, prices have remained almost stationary for nearly two weeks. Formerly lack of buying has meant lower prices, but the firmness is generally claimed as due largely to two causes: One, a fairly large demand for export and the other, a belief that the curtailment in mine production is of such an extent as to correct ultimately a condition which has been abnormal for some time. The effect of curtailment, however, which is estimated as high as 10 per cent, will not be felt for two or three months so far as statistics are con-cerned, but it is apparently having some influence already on the course of prices. Electrolytic copper is fairly firm from practically all producers and nominal at 13.37 1/2c., delivered in the Connecticut Valley. There have been a few small lots available now and then as low as 13.32½c. to 13.35c., delivered. Copper Exporters, Inc., continue to quote 13.65c. c.i.f. Hamburg. Buying for foreign consumption has been fairly good the past week. Lake copper continues unchanged at 13.50c., delivered.

Tin.—Yesterday, Monday, the market was very active with sales totalling about 500 tons. In the morning the bidding and buying was done almost entirely by London houses. In the afternoon consumers bought freely, including deliveries into July, and the market closed very strong. Today the market has been only moderately active with spot Straits tin quoted at 69.25c., New York. In London today prices were as follows: Spot standard £315 10s., future standard £300 5s. and spot Straits £325 10s. per ton. The Singapore price today was £307. For the week ended Saturday, the market was quiet with consumers showing little interest and dealers quite inactive. Sales for that week were 750 tons. Conditions part of the time are described as somewhat unusual in that on certain days, when there were sellers there were no buyers, and when there were buyers there were no sellers. Arrivals thus far this month have been 3760 tons, with 7030 tons reported afloat.

Lead .- The market has continued to be exceedingly quiet with prices unchanged and the leading interest continuing 7.65c., New York, as its contract price and the outside market generally ruling at 7.40c., St. Louis, until recently when 7.30c. has been the prevailing price. It develops that some little time ago, when buying was heavy, consumers were allowed to cover themselves for some time ahead which accounts in part for the inactivity now. It is pointed out that the price in London has slowly but quite generally declined, which is regarded as a threat to the market here on ore lead coming to this locality. In other words, conditions are such that it is nearly possible to pay the duty of 1½c. per lb. and compete with American lead at 7.65c. Such a situation would indicate a

Metals from New York Warehouse

Delivered Prices per Lb.

Tin, Straits pig
Copper, Lake 14.62½c. Copper, electrolytic 14.37½c.
Copper. casting 13.87 ½c. Zinc, slab 7.75c. to 8.25c.
Lead, American pig 8.50c. to 9.00c. Lead, bar
Antimony, Asiatic
anteed over 99 per cent pure) 29.00c. to 30.00c. Babbitt metal, commercial grade 30.00c. to 40.00c. Solder, ½ and ½

Metals from Cleveland Warehouse

Delinered Prices ner I.h

Tin, Straits pig
Tin, bar
Copper, Lake14.00c.
Copper, electrolytic14.00c.
Copper, casting
Zinc, slab 8.25c.
Lead, American pig 8.50c.
Antimony, Asiatic
Lead, bar
Babbitt metal, medium grade23.75c.
Babbitt metal, high grade
Solder, ½ and ½44.75c.
Solder, 72 and 72

Rolled Metals from New York or Cleveland Warehouse

motive a rivery motor por me.
Sheets-
High brass
Seamless Tubes—
Brass 23.25c. to 24.25c. Copper 24.00c. to 25.00c.
Brazed Brass Tubes26.12 ½c. to 27.12 ½c. Brass Rods15.87 ½c. to 16.87 ½c.
From New York Warehouse

Zinc sheets (No. 9), casks.....12.75c. to 13.00c. Zinc sheets, open............13.25c. to 13.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products and on lead full sheets are still holding at the advances of Feb. 28 and March 3 respectively. Zinc sheets have not changed since Jan. 10.

List Prices, per Lb., f.o.b. Mill
On Copper and Brass Products, Freight up to
75c. per 100 Lb. Allowed on Shipments
of 500 Lb. or Over

Sheets—
High brass
Seamless Tubes—
High brass
Rods-
High brass
Wire-
Copper
Copper in Rolls

Aluminum Products in Ton Lots The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Tr	rucking to Customers' City Limits)	Doors in
Sheets-		Base per Lb.
Copper, hot ro Copper, cold ro Zinc	iled iled, 14 oz. and heavier	22.00c. r24.25c, 12.00c.
Seamless Tubes-	A COST I STATE OF THE PARTY OF	
Brazed Brass Tu Brass Rods	bes	26.37½c. 16.12½c.

declining rather than a rising market in the near future.

Zinc.—The market has sagged, partly due to its own weight, until prime Western zinc is quoted today, Tuesday, at 6.65c. to 6.70c., St. Louis, or 7c. to 7.05c., New York, the lowest price in some weeks. A sale of 1000 tons is reported yesterday, but otherwise transactions have been limited to small amounts. Ore prices continue for the fourth week at \$45 per ton at Joplin, Mo., with sales fairly large.

Antimony.-Due to the conditions at Shanghai, Chinese metal is firmer than last week at 13c., New York, duty paid, for both spot and future deliveries.

Nickel.-Ingot nickel in wholesale lots is quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 26c. per lb., delivered.

Non-Ferrous Metals at Chicago

MARCH 22.—This market is quiet and the prices of tin and lead are lower. Old metals are in fair demand but prices lack firmness.

We quote in carload lots: Lake copper, 13.75c.; tin, 70.50c.; lead, 7.45c.; zinc, 6.85c.; in less than carload lots, antimony, 14c. On old metals we quote copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 7.25c.; lead pipe, 6.25c.; zinc, 4.25c.; pewter, No. 1, 35c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 15c.; all being dealers' prices for less than carload lots.

Single Standard of Reinforcing Bar Adopted

(Concluded from page 850)

question to engineers. D. H. Sawyer, Associated General Contractors of America, Inc., Washington, strongly urged the adoption of one grade. H. J. Burt, designing engineer of Chicago, said that in Chicago ordinances require certain unit stresses that make it necessary to use the hard grade in order to effect economies. He expressed the opinion that the steering committee should get engineers to agree upon what stresses are desirable. Dr. H. W. Gillett, head of the metallurgical division, Bureau of Standards, explained that this question is now being studied by the division of building and housing, Department of Commerce.

Committee Instructed to Put Plan Into Effect

The steering committee, through a motion, was authorized to work out details of the program and to get into touch with all research work, to maintain close relations with all interested groups and learn how the program has operated and to report at a conference to be held within one year in Washington. A motion by Mr. Shuman provided that the American Society for Testing Materials be apprised of the action taken by the committee, so that the society might take under advisement the desirability of furthering the movement of standardization by suitable revision in existing specifications.

E. W. Ely, assistant director of the National Committee on Metals Utilization, made it clear, in the course of discussion, that no injury would arise from present contracts, production schedules or otherwise from adoption of the single grade and pointed to the economies that would accrue, once it had been made effective as the standard.

Old Metals, Per Pound, New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

riot	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire		12.00c.
Copper, light and bottoms	9.25c.	11.00c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition.	8.50c.	10.00c.
No. 1 yellow brass turnings.	7.75c.	8.625c.
No. 1 red brass or composi-		
tion turnings	8.00c.	9.00c.
Lead, heavy	6.50c.	7.00c.
Lead, tea	4.50c.	5.25c.
Zine	4.00c.	4.50c.
Sheet aluminum	15.00c.	17.00c.
Cast aluminum	15.00c.	.17.00c.

REINFORCING STEEL

Awards Amount to 5400 Tons in Small Jobs and Inquiries Total 2700 Tons

A slight gain in awards of concrete reinforcing steel in the past week is indicated by reports of a number of small projects totaling about 5400 tons. New jobs on which bids were asked totaled 2700 tons of bars. Awards follow:

LYNN, Mass., 900 tons, sewage outfall, to Concrete Steel Co. CAMBRIDGE, MASS., 150 tons, Central Square Trust Co. bank building, to Joseph T. Ryerson & Son, Inc., Boston

ALBANY, N. Y., 400 tons, State office building, to Joseph T. Ryerson & Son, Inc.

NEWARK, N. J., 300 tons, addition to L. Bamberger & Co. store from Foundation Co., general contractor, to Jones & Laughlin Steel Corporation.

NEWARK, 150 tons, addition to City Hall, to Igoe Brothers. ROCHESTER, N. Y., 175 tons, addition to Eastman Kodak plant, to a Buffalo company.

Norristown, Pa., 115 tons, high school, to McClintic-Marshall Co.

CHICAGO, 150 tons of rail steel, warehouse for the Philadelphia Battery Co., to Kalman Steel Co.

CHICAGO, 350 tons of rail steel, warehouse for the Walgreen Drug Co., to Barton Spiderweb System. CHICAGO, 500 tons, apartment building at 210 East Pearson

Street, to Barton Spiderweb System. KENOSHA, WIS., 125 tons, theater, to American System of

Reinforcing. MILWAUKEE, 400 tons, warehouse for the National Tea Co.,

to Concrete Engineering Co.

St. Louis, 450 tons; apartment house at Spring Avenue and Lindell Boulevard 300 tons, garage at 3656 Washington Avenue 100 tons, and garage at Page and Easton Avenues 50 tons, all to Laclede Steel Co.

Houston, Tex., 378 tons, steel reinforcing for road work, to an unnamed firm.

HOQUIAM, WASH., 125 tons, bridge over the Hoquiam River at Hoquiam, to an unnamed firm.

SAN DIEGO, CAL., 100 tons, steel reinforcing for county road work, to an unnamed company.

Los Angeles, 500 tons, apartment house, to an unnamed local jobber.

SAN FRANCISCO, 150 tons, warehouse for Pacific Coast Syrup Co., to an unnamed local jobber.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 200 tons, White service station; general contract not let.

Buffalo, 300 tons, store for Victor & Co.; bids out. Akron, Ohio, 1000 tons for sewer work.

WARREN, PA., 100 tons, plant building for New Process Corporation; bids out.

CHICAGO, 110 tons, Ridgwood Court Gardens apartment building; Leischenko & Esser, architects. CHICAGO, 115 tons, apartment building and store for Izaac

& Vogel; Koenigsberg & Weisfeld, architects. CHICAGO.

ICAGO, 170 tons, apartment building at Seventleth Street and Jeffery Avenue; Koenigsberg & Weisfeld, architects. CHICAGO, 400 tons, apartment building at 431 Oakdale Avenue; Quinn & Christensen, architects.

WAUBAU, Wis., 300 tons, bars for new Scott Street bridge; State Highway Commission closes bids April 1.

PERSONAL

John F. Barr, formerly associated with Sargent & Co., New Haven, Conn., has been appointed export manager of the Chain Products Co., Cleveland, and its asso-

ciated companies, the Van Dorn Electric Tool Co. and the Van Dorn & Dutton Co., also of Cleveland. While connected with the Sargent organization Mr. Barr served for a time as its representative at Buenos Aires, and later was in charge of export business at New York. More recently he has been associated with A. H. Keleher, Inc., New York, direct factory export representative, and represented this company in Brazil during 1925. George C. Wiseman, formerly special representative on tools and machinery for the P. A. Geier Co., Cleveland, has been made dis-



trict representative for the new Hodell tire chain sales and service station of the Chain Products Co.

S. R. Morris, secretary and treasurer Steel Plate Products Co., Pottstown, Pa., has been elected president of that company to succeed P. L. Keiser, whose interest he has purchased. Mr. Morris was identified in metallurgical and engineering capacities for some 10 years with the National Tube Co. and other companies in the Pittsburgh district, and in 1917 joined Mr. Keiser in the organization of the Pottstown company.

H. L. Beyer, formerly vice-president Hale-Kilburn Co. and general manager American Motor Body Corporation, Eighteenth Street and Lehigh Avenue, Philadelphia, has been appointed treasurer of the Edgcomb Steel Co., Eleventh and Cambria Streets, Philadelphia, warehouse distributer in that district for a number of steel companies. He will also be a director of the Edgcomb Steel Corporation, recently organized to operate a steel warehouse at Newark, N. J. Mr. Beyer was purchasing agent for the Hale-Kilburn Co. and sub-sidiaries for a number of years and was a pioneer member of the Purchasng Agents' Association of Phil-

Karl Lehnhardt has been appointed representative in New York for the Skinner Chuck Co., New Britain, Conn., and will have headquarters at 86 Warren Street.

Edward R. Bishop, for 15 years manager forge department, Globe Malleable Iron & Steel Co., Syracuse, N. Y., has been appointed general manager of the company, succeeding Harry H. Elmer, resigned.

H. A. Moore, formerly sales manager High Speed Hammer Co., Rochester, N. Y., has been appointed gen-eral sales manager of the Foster Machine Co., Elk-

G. N. Bull, formerly in the Washington office of the Worthington Pump & Machinery Corporation, New York, has been made district manager in New York for the Lincoln Electric Co., Cleveland. C. S. Freeman, recently in charge of the Lancaster, Pa., office of the electric company, has been appointed its Buffalo district manager. His place at Lancaster has been filled by S. W. Shultz, lately of the Philadelphia sales organization. Edward J. Pfister of the Buffalo office has been transferred to Philadelphia.

H. A. Perkins, formerly general manager American Woodworking Machinery Co., Rochester, is president of

the newly organized Production Machinery Sales Corporation, 52 Vanderbilt Avenue, New York, which will act as Eastern sales agent for eight manufacturers of woodworking machinery. G. S. MacDowell, vice-presi-dent and treasurer of the new organization, was also associated with the American company for a number

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Walter F. Merkel, since 1925 chief engineer Hudson Valley Coke & Products Corporation, Troy, N. Y., has been appointed general manager of the Steel Plate Products Co., Pottstown, Pa. He began his career as foreman in the merchant mill of the Lackawanna Steel Co., Buffalo, and was later associated with the Eastern Steel Co. at Pottstown, first as assistant master mechanic and later as chief engineer.

Harold Jay has resigned as sales manager of the Acklin Stamping Co., Toledo, Ohio, and will become connected with the sales department of the Detroit Gear & Machine Co., Detroit. His sales work will be in connection with automobile transmissions.

H. Temple Barber has been appointed eastern Michigan district sales manager of the Fitzsimons Co., Youngstown, manufacturer of cold-finished steel bars. His office will be at 2970 West Grand Boulevard, De-

O. L. Rimoldi has been appointed New York district manager for the Triumph Electric Corporation, Cinmanager for the Triumph Electric Corporation, Cincinnati, with headquarters at 844 Woolworth Building. E. W. Martin, 447 Monadnock Block, Chicago, has been appointed the company's district manager in that city, and Frank E. Gibson has joined the manufacturers' agency of E. B. Busby, 2315 Dime Bank Building, Detroit, to represent the electric corporation's interests in the Detroit territory.

S. R. Keith, formerly vice-president and works manager Hardite Metals, Inc., Long Island City, N. Y., has been appointed manager of Inert Metal Products, Inc., Stuyvesant Falls, N. Y., with offices at 1 Pershing Square, New York.

Prof. Joseph P. Roe, head of the Department of Industrial Engineering at New York University, was presented with the Order of the White Lion at a special meeting of the Masaryk Academy of Prague, Czechoslovakia, on March 18. The order, which is an honorary decoration, bestowed only upon foreigners, was conferred in recognition of his scientific work. Professor Roe is at present lecturing in Europe on scientific management.

William J. Breen has been appointed direct factory representative for the sale of Niagara pig iron in New England for the Donner Steel Co., Buffalo. His headquarters will be at 192 Mystic Valley Parkway, Winchester, Mass.

Keith D. Graham, for the last year in charge of production for the Root Co., Bristol, Conn., has been appointed secretary of the company. He entered its employ in 1916 as stock clerk.

Francis B. Shuster of Frank Samuel & Co., Boston, who has been in the Southwest for his health, is back at his desk.

Marshall T. Jones, since April 13, 1925, assistant chief of the iron and steel division, Department of Commerce, has been made acting chief of the electrical division, effective April 1, succeeding D. S. Wegg, resigned. Mr. Jones came to Washington from Montclair, N. J., and is a graduate engineer of Cornell University. For an extensive period he was a sales representative of American corporations, being situated in the Far East and Latin America. Entering the export department of the Standard Oil Co. in 1913 he was sent to Hongkong, China, remaining with that company for three years as manager of the lubricating oil department for the South China field. During the world war he served with the Tank Corps. In 1919 he became associated with the United States Steel Products Co., and subsequently was detailed to Calcutta, India, and Shanghai, China, where he worked for three years as an engineer for the American Bridge Co. In 1924 he entered the employ of Henry W. Peabody & Co., New York, being assigned to Buenos Aires, Argentina, and serving for eight months as sales representative.

Electrochemists to Hold Silver Jubilee Meeting

The American Electrochemical Society is celebrating its silver jubilee at the coming annual meeting, to be held at the Hotel Benjamin Franklin, Philadelphia,

April 27 to 30.

It was at Philadelphia in 1902 that the first meeting was held. Among the charter members are the names of engineers and scientists who have gained worldwide reputation for their accomplishments in electrochemistry: E. G. Acheson, Lawrence Addicks, W. D. Bancroft, C. F. Burgess, G. H. Clamer, F. A. J. Fitz-Gerald, Carl Hering, William Hoskins, R. S. Hutton, Louis Kahlenberg, J. W. Richards, E. F. Roeber, A. J. Rossi, S. P. Sadtler, Pedro G. Salom, E. A. Sperry, E. R. Taylor, F. J. Tone, W. R. Whitney, and many others.

Many of the charter members will attend the Philadelphia convention and a number of them will present brief accounts of the early days of the society and the development of their particular electrochemical line during the past 25 years. C. G. Schluederberg, Westinghouse Electric & Mfg. Co., is chairman of the committee on arrangements for the program commemorating the founding of the society. Prof. Edgar Fahs Smith, of the University of Pennsylvania, an honorary member of the society, will preside at this session.

The changes that have taken place in electrochem-

The changes that have taken place in electrochemistry, in both theory and practice, will be strikingly portrayed in two of the other main sessions of the convention. One of these will be devoted to a symposium on the electrochemistry of concentrated solutions. A feature of this will be the address by Prof. Peter Debye, of the University of Zurich, Switzerland, on "The Dielectric Constant of Electrolyte Solutions." Professor Debye has been one of the foremost exponents of the new theoretical developments in electrochemistry and he will participate actively in the discussion. Prof. Hugh S. Taylor, of Princeton University, will preside at this session.

The electrothermic division of the society has arranged a very interesting session on the gaseous reduction of ores and other metal compounds. Details of this session will be announced later. The electrodeposition division will hold a session on Saturday morning, April 30, to discuss a series of papers on chromium, cobalt, nickel, zinc, copper, and tin.

The local Philadelphia committee, Frank Hodson, chairman, has been most active in looking after the details of the program. Many interesting visits have been arranged to various industrial plants in and near Philadelphia. The convention promises to be the largest and most attractive in the annals of the society.

The Boston chapter of the American Society for Steel Treating has two more meetings scheduled for this year. On April 1 there will be an inspection of the new blast furnace of the Mystic Iron Works at Everett, Mass., during the afternoon, and a talk on malleable iron castings at the Massachusetts Institute of Technology in the evening. The annual meeting will be held May 6, at the Beverly, Mass., plant of the United Shoe Machinery Corporation. At that meeting forging by the upset process will be discussed.

Plant maintenance is the topic of a dinner meeting of the metropolitan branch of the American Society of Mechanical Engineers to be held March 28 at Achtel Stetter's restaurant, 842 Broad Street, Newark, N. J. G. H. Ashman, engineer General Electric Co., will be the speaker.

OBITUARY

JOHN MAHER, president and manager of the Cuyahoga Boiler Works Co., Cleveland, was drowned on March 18 at Bay City, Mich., while visiting relatives in that city. He was 75 years of age.

DAVID JAMESON, vice-president National Radiator Co., New Castle, Pa., and a director of the Standard Sanitary Mfg. Co., Pittsburgh, died March 20 at his home in New Castle. He was 71 years of age, and was a former national president of the American Automobile Association.

J. A. BUCKWALTER, president Buckwalter Stove Co., Royersford, Pa., died on March 5 at his home in that city.

JOHN H. MORRISON, president Franklin Foundry Co., Franklin, Pa., died on March 13 at his home in Oil City, Pa. He was 71 years of age and had been president of the Franklin company for 16 years.

FRANK L. SHALLENBERGER, formerly secretary Hockensmith Wheel & Mine Car Co., Jeannette, Pa., died at his home in Greensburg, Pa., March 16. He was born in Pittsburgh 78 years ago.

ARTHUR KELLER, chief electrical engineer Harnischfeger Corporation, Milwaukee, died on March 12 at his home in that city. He was born in Switzerland in 1882, and attended among others the University of Zurich. He had been associated with the Harnischfeger organization for 20 years and was active in designing electrical equipment for cranes. He was a member of the American Institute of Electrical Engineers and of the Association of Iron and Steel Electrical Engineers.

JOHN MOORHEAD, JR., for 40 years president Moorhead, Brother & Co., Inc., Sharpsburg, Pa., one of the early iron rolling companies of the Pittsburgh district, died at his home in Pittsburgh March 15. The com-pany, founded by Mr. Moorhead's father in 1846 as Vesuvius Iron & Nail Works, went out of business about three years ago and the plant since has been It produced puddled iron and rolled it dismantled. into muck bar, merchant bar and plates. Mr. Moorhead was 68 years old and joined his father's company in 1880, following his graduation from Yale University. A few years later he succeeded his father as president, holding the position to the end of the com-pany's existence. At Yale, he was a member of the varsity football team in 1878, 1879 and 1880. He was an ardent golfer and was credited with introducing the game into Pittsburgh. He was a director of the Standard Underground Cable Co. and vice-presdent and a director of the Exchange National Bank, Pittsburgh.

Reports from 42 manufacturing plants in Worcester, Mass., and suburbs show an average of 23,336 persons employed during January, compared with 23,147 in December, and 23,205 in January, 1926. Included in the plants reporting were the American Steel & Wire Co., the Crompton & Knowles Loom Works, Norton Co., Graton & Knight Co., Morgan Construction Co., the Reed & Prince Mfg. Co. and others whose experience constitutes an index of industrial activity. February figures, however, may not prove so favorable, as the State Public Employment office which has wide contact with industry reports that employers' orders for help were 34 per cent less than in February, 1925, while the number of positions filled was 44 per cent less.

Fuel engineering is announced as a new two-year course at the Towne Scientific School, University of Pennsylvania, Philadelphia. This will begin Sept. 30 next. It will be carried on largely by lectures of leading national authorities. An impressive list has been developed, for lectures on their own specialized topics.

Machinery Markets and News of the Works

ORDERS SHOW NO GAIN

Machine Tool Business for March Not Up to Expectations

Industrial Activity in Some Sections Falling Off and Working Forces Are Reduced

MACHINE tool business is feeling the reflection of spotty industrial activity. Some metalworking plants are not receiving the volume of business that had been expected this month and consequently are not buying new equipment. Working forces have been reduced in quite a number of plants. Although there has been a gain in the volume of automobile manufac-

turing in the Detroit district since the first of the year, not all branches of the automotive industry are as busy as a year ago. Orders for tools from the automobile industry are scarce.

It seems unlikely that machine tool business in March will much exceed that of February when allowance is made for the longer month.

A good deal of railroad inquiry is still pending, and this constitutes one of the most hopeful features of the situation. The Brooklyn-Manhattan Transit Co. is expected to place orders this week or next against a fairly large list which has been pending for about six months.

An inquiry for 15 turret lathes from Russia is noteworthy in the export market.

New York

New York, March 22.

MACHINE tool business is showing no improvement. Orders are about on a par with February sales. Inquiries are not numerous. Among manufacturing plants conditions are spotty. In some metal-working lines there is a fairly full operation, but truck manufacturers and makers of automobile parts have not found business up to expectations for this time of year, and there has been a slight cutting down of working forces.

Among machine tool orders of the week were the following: Electrical manufacturer, 28-in. x 8-ft. lathe; a Pittsburgh steel company, a side-head boring mill; Chicago, Rock Island & Pacific Railroad, a grinding machine; a tube manufacturer in Newark, N. J., a 2-spindle drill press; an automobile parts company at Columbus, Ohio, a tapping machine; two companies at Dayton, Ohio, a jig borer to each; a Saginaw, Mich., manufacturer, a worm grinder; a radiator manufacturer at Kansas City, Mo., a 13-in. lathe; the Pratt & Whitney Aircraft Co., two 13-in. lathes; an ice machine manufacturer at Canton, Ohio, a 16-in. lathe; an iron rolling mill at Lebanon, Pa., a 16-in. lathe; a manufacturer at Holland, Mich., a vertical shaper.

The Adirondack Power & Light Corporation, Amsterdam, N. Y., has preliminary plans for a new service, equipment and operating building at Schenectady, N. Y., to cost about \$300,000 with equipment.

Nathan Rotholz, 1354 Morris Avenue, New York, architect, has taken out a permit for a one-story automobile service, repair and garage building, 144 x 244 ft., at Broadway and 233rd Street, to cost about \$300,000 with equipment.

The Board of Education, 500 Park Avenue, New York, plans the installation of vocational training and engineering equipment in the proposed technical high school to be erected at DeKalb Avenue, South Elliott Street and Fort Greene Place, Brooklyn, estimated to cost more than \$1,300,000, for which plans are being prepared by William Ht. Gompert, Flatbush Avenue Extension, Brooklyn, architecture.

Parker & Shaffer, 280 Madison Avenue, New York, architects, have filed plans for a 10-story automobile service, repair and garage building, 100 x 125 ft., at 533-41 West Fifty-seventh Street, to cost \$500,000 with equipment. General building contract has been let to the H. D. Best Co., 949 Broadway.

C. J. Haas, 173 West Broadway, New York, manufacturer of metal specialties, lamp shades, etc., has leased the two-story factory, 50 x 100 ft., at 308-10 Thirteenth Street, West New York, N. J., and will remodel for a new plant. The present works will be removed to the new location.

The Bayonne Steel Ceiling Co. of New York, Inc., 223 West Nineteenth Street, New York, will soon take bids on a general contract for a two-story plant at Long Island City. William Higginson, 15 Park Row, New York, is architect.

The New York Central Railroad Co., C. S. White, purchasing agent, room 344, 466 Lexington Avenue, New York, is asking bids until March 28 for woven wire fencing, fence posts, etc., serial contract No. 8-1927.

The Department of Mental Hygiene, Capitol Building, Albany, N. Y., is asking bids until April 13 for refrigerating equipment for installation at the Veterans' Memorial Hospital, Kings Park, N. Y. Plans and specifications at the office of the State architect, Capitol Building, and 948 Broadway, New York.

The International Paper Co., 1 Pershing Square, New York, has secured an option on the plant of the Bath Iron Works, Bath, Me., which has been idle for several years. Negotiations are also under way for adjoining waterfront facilities. It is proposed to convert the property for a new unloading and distributing plant for pulp wood, coal and other raw materials. Mechanical conveying and handling equipment will be installed, storage bins and other facilities.

Frank Parker, 280 Madison Avenue, New York, architect, is said to be arranging an early call for bids on a general contract for a seven-story automobile service, repair and garage building, 100 x 200 ft., at 211-25 West Sixty-first Street, reported to cost in excess of \$350,000 with equipment.

The Allied Chemical & Dye Corporation, 61 Broadway. New York, is preparing plans for the initial units of its new plant at Hopewell, Va., for the production of synthetic nitrogen compounds. A 400-acre tract has been secured. The plant will include a machine shop, power house and other buildings, and will cost in excess of \$15,000,000. William H. Nichols is chairman of the board.

L. J. Land, 207 Centre Street, New York, machinery dealer, is in the market for a caterpillar crane, about 5000 lb. capacity, 40 to 50 ft. boom.

The Yale Electric Corporation, 60 Tillary Street, Brooklyn, manufacturer of electrical equipment, has selected property at Jersey City, N. J., as a site for a new plant, to cost in excess of \$500,000 with equipment. It is understood that the present factory will be removed to the new location, where production will be concentrated.

The Egyptian Lacquer Mfg. Co., Jacobus Avenue, Kearny, N. J., has awarded a general contract to the White Construction Co., 95 Madison Avenue, New York, for an addition, estimated to cost more than \$150,000 with equipment. The company will erect also a one-story service, repair and garage building. Lockwood, Greene & Co., 1 Pershing Square, New York, are architects and engineers.

The Essex County Board of Vocational Education, 969 Broad Street, Newark, N. J., has engaged Guilbert & Betelle, 24 Branford Place, architects, to prepare plans for the proposed boys' vocational school at Bloomfield, N. J., to cost more than \$400,000 with equipment. It will replace a structure at West Orange, N. J., destroyed by fire a number of months ago.

The Interstate Sheet Metal Corporation, 391 Mulberry Street, Newark, N. J., has leased space in the building at 377-95 Frelinghuysen Avenue for the establishment of a new plant which will provide considerable increase over the present factory.

The Auto Strop Safety Razor Co., Virginia Avenue, Newark, has asked bids on a general contract for a new onestory plant, 65 x 225 ft., to cost about \$75,000. The present business will be removed to the new location and capacity increased. Parker & Shaffer, 280 Madison Avenue, New York, are architects.

John C. Kohaut, Inc., 117 Green Street, Newark, operating a wood-working plant, has acquired adjoining property, 70×75 ft., for an addition, for which plans will soon be drawn. It is reported to cost more than \$40,000 with machinery.

The Crosley Radio Corporation, Colerain Street, Cincinnati, is concluding negotiations for the purchase of the property of the DeForest Radio Co., 139 Franklin Street, Jersey City, N. J., now in receivership. The purchasing company is arranging for an increase in capital to \$3,000,000, and 600,000 shares of stock, no par value, to provide for the acquisition and other expansion. It is understood that the DeForest works will be removed to the Cincinnati plant, which recently has been extended, and production concentrated here.

The Bennet Insured Steel Treating Co., 109 Tichenor Street, Newark, has started in business and specializes in heat treating. W. R. Bennet owner of the new company, was founder of the Bennet Heat Treating Co., Hartford, Conn.

The Mahr Mfg. Co., Minneapolis, manufacturer of rivet forges, torches, furnaces and oil burning equipment, has removed its New York office to 55 West Forty-second Street.

The Steel Cable Co., Brooklyn, has removed its headquarters to 215 Seventh Street.

The Broderick & Bascom Rope Co., 901 North First Street, St. Louis, has removed its New York warehouse to the Edgar C. Ruwe Building, 68-72 Washington Street.

F. A. Errington, 11 John Street, New York, manufacturer of tapping chucks, multiple tapping heads and multiple drilling heads, has taken the firm name of the Errington Mechanical Laboratory and has moved to Clifton, Staten Island.

Philadelphia

PHILADELPHIA, March 21.

CONTRACT has been let by the Steel Heddle Mfg. Co., Twenty-first Street and Allegheny Avenue, Philadelphia, manufacturer of textile mill equipment, to the William Steele & Sons Co., for a five-story and basement addition, 95 x 100 ft.

Paul W. Bounds, 3100 Rosehill Street, Philadelphia, operating a cut stone works, has acquired a tract of 3½ acres, heretofore held by Richard DeCou & Co., iron products, and plans the construction of a new plant to cost about \$150,000 with machinery.

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The Firestone Tire & Rubber Co., Akron, Ohio, and 2401 Chestnut Street, Philadelphia, has acquired property at Twenty-third and Wood Streets, and plans the erection of a new factory branch and distributing plant to cost in excess of \$100,000.

The Philadelphia Boiler Works, 1737 Filbert Street, Philadelphia, has awarded a general contract to the Fred A. Havens Co., 845 North Nineteenth Street, for a new two-story and basement plant. Ralph Bencker, Chestnut and Thirteenth Streets, is architect.

The Fisk Rubber Co., 250 West Fifty-seventh Street, New York, with plant at Chicopee, Mass., has plans under way for a new factory branch and distributing plant at Indiana Avenue and Seventeenth Street, Philadelphia, to cost \$100,000 with equipment. Andrew J. Sauer & Co., Schaff Building, are architects.

The Greene Engineering Co., Drexel Building, Philadelphia, has been inquiring for a number of electric motors from 15 to 60-hp., a.c., 3-phase, 60-cycle; also for a motor-driven centrifugal pumping unit, 300-gal. capacity per min.

Tunis & Baker, Insurance Company of North America Building, Philadelphia, architects, have plans for a twostory and basement automobile service, repair and garage building, 90 x 155 ft., to cost about \$150,000 with equipment.

The American Brown Boveri Electric Corporation, 165 Broadway, New York, has concluded arrangements with Maschinenfabrik-Augsburg Nurnberg A. C., Germany, for license to manufacture the M. A. N. Diesel engines for railroad traction service in the United States, including electric main line locomotives, switching locomotives and Diesel electric rail cars. It is proposed to develop a portion of the plant at Camden, N. J., for this branch of production, in addition to the manufacture of turbo-generators and other primary electrical machinery.

The Pennsylvania Railroad Co., Seventeenth and Filbert Streets, Philadelphia, C. E. Walsh, purchasing agent, is

asking bids until March 30 for a quantity of guy and messenger strand wire and wire rope, contract 31-1927; boiler tubes and steel pipe, contract 34-1927; track boits, track spikes, tie plates, etc., contract 36-1927; woven wire fencing and fence posts, contract 32-1927; and car, driving, trailer and engine truck axles, contract 29-1927.

The Board of Trustees, Princeton University, Princeton, N. J., has awarded a general contract to the Matthews Construction Co., Princeton, for a three-story engineering and mechanical laboratory, to cost \$250,000, with equipment. Charles Z. Klauder, 1429 Walnut Street, Philadelphia, is architect.

The Board of Education, Sayre, Pa., plans the installation of manual training equipment in a proposed two-story and basement high school to cost \$450,000, for which plans will be prepared by Randall & Vedder, 703-5 Sedgwick Avenue, Syracuse, N. Y., architects.

The Keystone Portland Cement Co., Commonwealth Building, Allentown, Pa., recently organized, will begin the construction of a proposed mill at Bath, Pa., where a tract of about 375 acres has been secured. The initial plant will be equipped for a capacity of close to 3000-bbl. per day and is reported to cost more than \$1,000,000. Equipment will be installed for the development of cement rock and limestone properties in the vicinity. A preferred stock issue aggregating \$2,500,000 is being sold, a portion of the fund to provide for the construction. John M. Buckland, head of the National Slag Co., Allentown, is president; Fred B. Franks, formerly vice-president of the Bath Portland Cement Co., is vice-president, and Edward J. Fox, treasurer.

The Nuss Mfg. Co., Cameron and Mulberry Streets, Harrisburg, Pa., operating a mechanical and plating works, has preliminary plans for a three-story addition for the manufacture and repair of automobile radiators, to cost close to \$45,000 with equipment. C. L. Lappley, Parkside Building, is architect.

The J. S. Thorn Co., Twentieth Street and Allegheny Avenue, Philadelphia, manufacturer of architectural iron and sheet metal specialties, is said to have plans under way for a new works at Erie Avenue and I Street.

The plant of the Smith Fence & Iron Co., North Franklin Street, Waynesboro, Pa., formerly operated by George W. Smith, recently deceased, will be sold by the Waynesboro Trust Co., administrator of the estate, as a going business. The factory specializes in the manufacture of iron fencing, fire escapes, fireproof stairways, etc.

The Certain-teed Products Corporation, 11 East Forty-second Street, New York, manufacturer of roofing, etc., has awarded a general contract to Stofflet & Tillotson, Wesley Building, Philadelphia, for a two-story addition, 110 x 145 ft., at York, Pa., to cost in excess of \$85,000.

New England

Boston, March 21.

SALES of new machine tools have been few, the aggregate local bookings the past week being smaller than for any previous week this year. March, instead of a profitable month, as previously anticipated, will be the leanest month so far in 1927. Dealers have a large number of machines under active negotiation, but are unable to close orders. Further lay offs, in one instance involving 1500 men, and the scaling down of weekly operating schedules are noted in various sections of New England. Optimism among metal-working plants early in January apparently has vanished. A wave of conservatism in expenditures for new equipment has swept over this territory, presumably because anticipated work has not developed. Generally speaking, expansion in different sections is confined largely to municipal needs and other projects involving no machine tools. Industrial plant expansion is at a minimum.

Used tool dealers report that most of the current prospective business is with shops having discarded equipment to offer in part or whole payment, an exchange proposition. Dealers are not inclined to do business on this basis and consequently bookings are as scarce as with new machine dealers.

The Dennison Mfg. Co., Framingham, Mass., has purchased the Northway Motor Co. plant at West Natick, Mass., for warehouse purposes and will abandon its Mariboro plant.

The machinery and equipment of the Barnet Drop Forge Co., Easthampton, Mass., will be sold at public auction March 25.

The Worcester Wire Works, 230 Ludlow Street, Worcester, Mass., will start work at once on a one-story, 28 x 147 ft., addition. Plans are private.

The Crane Market

OMPARED with the usual spring increase in the num-) ber of inquiries for overhead and locomotive cranes, current requests for prices on such equipment is small. Competition continues keen and prices, as a rule, low. The used equipment field, however, is fairly active. Among recent inquiries for used equipment is a request for prices on a crawl-tread steam shovel of \%-cu, yd. or 1-cu, yd. capacity from the Papin Contracting Co., 314 South Grand Avenue, St. Louis, The Foundation Co., 120 Liberty Street, New York, which closed on a 15-ton hand power crane for export to Chile, has not yet awarded several chain blocks and trolleys for domestic installation.

Among recent purchases are:

Anaconda Copper Mining Co., 25 Broadway, three 40-ton electric traveling cranes for Chile, reported purchased from the Whiting Corporation.

Foundation Co., 120 Liberty Street, New York, a 15-ton hand power crane for a refrigerating plant in Chile from an unnamed builder.

United Railways, St. Louis, a 10-ton, 4-wheel, electric driven locomotive crane from the American Hoist & Der-

Stupp Brothers Bridge & Iron Co., St. Louis, a 15-ton, 50-ft. boom used locomotive crane from a local dealer.

Buick Motor Co., Flint, Mich., 88 small, hand power jib cranes from H. D. Conkey & Co. Spruck Foundry & Iron Co., St. Louis, a small motor-

driven overhead crane from H. D. Conkey & Co.

Earl C. Maxwell Co., Brooklyn, N. Y., a small motordriven overhead crane from H. D. Conkey & Co.

John J. Tighe Brass & Iron Foundry, Brooklyn, N. Y., 10-ton electric traveling crane from the Box Crane & Hoist Corporation.

American Sheet & Tin Piate Co., Pittsburgh, one 75-ton, 180-ft. span and four 30-ton, 60-ft. and 90-ft. span overhead cranes for Gary, Ind., from the Alliance Machine Co.; two 5-ton, 60-ft. span, one 10-ton, 90-ft. span and four 15-ton, 60-ft., 33-ft. and 23-ft. span cranes for Gary, Ind., from the Cleveland Crane & Engineering Co.; and one 15-ton, 56-ft. span overhead crane for Elwood, Ind., from the Shaw Electric Crane Co.

Tibbets Construction Co., Dallas, Tex., a 10-ton, gasoline operated crawl-tread locomotive crane with \(^4\)-cu. yd. bucket from the Orton Crane & Shovel Co.

Houston Wood Preserving Co., Houston, Tex., an 18-ton, standard gage locomotive crane from the Orton Crane & Shovel Co.

Sargent & Lundy, Chicago, a 2½-cu. yd. bucket crane from the Northern Engineering Works.

Henry L. Scott Co., 101 Blackstone Street, Providence, is putting in foundations for a two-story and basement, 51 x 68 ft., machine shop addition. E. P. Sheldon & Sons, 1008 Hospital Trust Building, Providence, are architects.

The Newport Grinding & Machine Co., 37 Long Wharf, Newport, R. I., is having plans prepared for a one-story, 50 x 70-ft., manufacturing plant. Plans are private.

John M. Gray, 175 High Street, and Smith & Walker, 80 Boylston Street, Boston, associate architects, are preparing plans for a one-story, 60×100 -ft., and three-story, 70×120 -ft., high school addition at Salem, Mass., to contain manual training departments.

The Hartford Electric Light Co., 310 Pearl Street, Hartford, Conn., will build a mercury boiler power plant. The project involves the installation of a 10,000-kw. turbine and Stone & Webster, Inc., 120 Broadway, New York, are the engineers.

The foundry and machine shop of J. & W. Jolly, Inc. 529 South East Street, Holyoke, Mass., suffered considerable damage by fire last week. Repairs are planned within the immediate future. Miscellaneous equipment will be required.

The Benjamin Richards Co., Lake Street, Winsted, Conn., plant, formerly used for the manufacture of curtain rods and hardware, is being remodeled by a new company for the manufacture of enameled insulated wire. James E. formerly secretary Strand & Sweet Mfg. Co., will head the new organization.

The Babcock & Wilcox Co, has removed its Boston office to the Chamber of Commerce Building, 80 Federal Street.

The Philbrick-Booth Foundry Co., Hartford, Conn., and Hartford Foundry Co., Wethersfield, Conn., effective April 1, will be consolidated under the name of Philbrick-Booth & Spencer, Inc., and all operations will be carried on at 367 Homestead Avenue, Hartford. The new corporation will produce gray iron castings of any size and nature.

The Spencer Turbine Co., 486 New Park Avenue, Hart-ford, Conn., has asked bids on a general contract for a sawtooth roof type addition, to cost more than one-story. \$25,000 with equipment. Buck & Sheldon, Inc., 60 Prospect Street, is architect and engineer.

The C. F. Trowbridge Co., Norwalk, Conn., is said to be planning to rebuild the portion of its paper box and carton manufacturing plant destroyed by fire March 12, with loss estimated at close to \$50,000 with equipment.

The Ward Baking Co., 140 Albany Street, Cambridge. Mass., has awarded a general contract to the Equity Construction Co., 25 West Forty-third Street, New York, for a one-story automobile service, repair and garage building, 112 x 150 ft., for company cars, to cost close to \$100,000 with Headquarters are at 367 Southern Boulevard, equipment. New York.

The Atlantic Works, 80 Border Street, Boston, manufacturer of marine engines, boats, etc., is reported to be planning the erection of a one-story addition to its machine shop, to cost close to \$25,000 with equipment.

The Board of Education, Farmington, Conn., has authorized the installation of manual training in its proposed new high school, for which superstructure will soon begin, estimated to cost \$225,000.

The United Illuminating Co., New Haven, Conn., has

plans, under way for a new steam-operated electric generating station, to cost in excess of \$2,500,000 with turbo-generators and other equipment. It is expected to begin work in May. Westcott & Mapes, New Haven, are engineers.

The New England Enameling Co., Middletown, Conn., has decided to discontinue operations, following the recent appointment of John M. Davis as receiver. The plant has running since the receivership and at one time gave employment to more than 600 operatives.

The Hartford Electric Light Co., 266 Pearl Street, Hartford, Conn., has awarded a general contract to Stone & Webster, Inc., 49 Federal Street, Boston, for an addition to its South Meadow steam-operated electric generating estimated to cost in excess of \$1,500,000 machinery.

The Saco-Lowell Shops, Newton Lower Falls, Mass., heretofore devoted exclusively to the production of machinery and equipment for textile mills, are expanding operations to include the manufacture of other products. The company recently started up a division for the production of metal refrigerator cabinets and proposes to develop this line. Another department will now be given over to the manufacture of shock absorbers of Hoffman type, particularly designed for Ford automobiles.

H. E. Cline, an official of the H. E. Cline Oven Co., 43 Tremont Street, Boston, is at the head of a project to construct a one-story automobile service, repair and garage building, 150 x 250 ft., to cost close to \$100,000 with equipment.

Buffalo

Buffalo, March 21.

THE O. M. Edwards Co., Plum Street, Syracuse, N. Y., manufacturer of steel office furniture, hardware specialties, etc., is having plans drawn by the H. K. Ferguson Co., Cleveland, for an addition to cost in excess of \$75,000 with equipment. New York headquarters are at 412 Broadway.

The Waverly Electric Light & Power Co., Waverly, near Binghamton, N. Y., is planning the construction of a new steam-operated electric power plant at Barton, N. Y., to cost close to \$50,000 with equipment.

The Elmira Water, Light & Railway Co., Elmira, N. Y. plans the construction of an automatic power substation in connection with a proposed new 110,000-volt transmission line from Elmira to Binghamton, N. Y. The entire project will cost in excess of \$200,000.

The Buffalo General Electric Co., Electric Building, Buffalo, has plans for an addition to its power and distributing station on Hertel Avenue, to cost about \$75,000 with equip-An addition will be constructed also to the power substation on Bailey Street, to cost about \$25,000.

The Niagara Lead Co., Lockport, N. Y., is a new organization which will engage in the smelting and refining of lead. Buildings formerly occupied by the Indurated Fiber Co. will be used. C. A. Johnson, president and general manager, was formerly president of the Mid-West Metal Co.

D. H. Burrell & Co., Inc., Little Falls, N. Y., manufacof dairy equipment, will erect a one-story addition. 60 x 200 ft.

Pittsburgh

PITTSBURGH, March 21.

MACHINE tool business is steady rather than active in this market. The run of single orders holds well, but there is still a paucity of new inquiries. The Union Railroad, the Pittsburgh interplant railroad of the Carnegie Steel Co., again is an active prospect for machine tool business for its locomotive repair shop. This railroad, through the Carnegie company several months ago, issued an inquiry for prices on equipment which has since been dormant. There is an inquiry now for a 150-ton double trolley locomotive handling crane and for a 10-ton crane for this shop which will be located at one of four or five sites in the Pittsburgh district owned by the Carnegie Steel Co. The Westinghouse Electric & Mfg. Co. is buying steadily tools against its quarterly list.

Plans are being prepared by the Pittsburgh Terminal Railroad Co., Wabash Building, Pittsburgh, for a new car shop at Rook, Pa., to cost in excess of \$50,000 with equipment. A one-story machine shop, 100 x 115 ft., will be constructed at the same location. H. H. Temple is chief engineer for the company.

The Standard Steel Spring Co., Coraopolis, Pa., is completing plans for the construction of its one-story addition, 75×240 ft., and 100×240 ft., to cost more than \$100,000 with equipment. J. M. Schoonmaker is company engineer.

The Monongahela West Penn Public Service Co., Fairmont, W. Va., has begun the erection of its new power plant at Hundred, W. Va., to be equipped with gas engine direct-connected to generator, and accessories.

The West Virginia Rail Co., Seventeenth Street and the Baltimore & Ohio Railroad, Huntington, W. Va., has concluded arrangements for the purchase of the plant of the Huntington Sash, Door & Trim Co., on adjoining site, for expansion. Existing buildings will be razed, new structures built and considerable additional machinery will be installed. H. A. Zeller is general manager.

The Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, has filed plans for an addition to its power house on Brunot's Island, to be equipped primarily as a switching and distributing station, estimated to cost \$850,000 with machinery.

The Guyan Machine Shops, Inc., Logan, W. Va., machinery dealer, has inquiries out for a lifting magnet to operate at 220-volt, d.c.; a power hack saw, with capacity for handling material up to 9 in. diameter; a 14 x 36-in. lathe, single pulley drive; japanning oven, suitable for handling large armatures; and for a number of 10 and 15-hp. motors.

The Board of Education, Martinsburg, W. Va., plans the installation of manual training equipment in a new two-story high school estimated to cost \$300,000, for which bids will be asked on a general contract early in April. Frampton & Bowers, 414 Eleventh Street, Huntington, W. Va., are architects.

The Watt Mfg. Co., Dasher Street, Pittsburgh, manufacturer of ornamental iron and steel products, has leased space in the building at 507-11 Reedsdale Street, Northside, for a new plant. The former property of the company on Dasher Street was acquired recently by the Baltimore & Ohio Railroad.

The National Forge & Tool Co., Irvine, Warren County, Pa., has changed its name to the National Forge & Ordnance Co.

St. Louis

Sr. Louis, March 21.

THE Board of Public Works, Carthage, Mo., is planning to ask bids during the summer for a municipal electric light and power plant, estimated to cost \$50,000. Clarence Hoen is engineer. Guy Wells is secretary of the board.

The Skelly Oil Co., El Dorado, Kan., operating oil refineries and properties in the Mid-Continent field, has arranged for a bond issue of \$15,000,000, a portion of the fund to be used for extensions and improvements, including installation of equipment.

The Choctaw Lumber Co., operated by the Dierks Lumber & Coal Co., Gates Building, Kansas City, Mo., plans the early installation of machinery in a new mill at Pine Valley, Okla., now in course of construction. The entire project will cost in excess of \$100,000.

The Crane Co., Chicago, has asked bids on a general contract for a two-story and basement factory branch and distributing plant at Oklahoma City, Okla., 80 x 270 ft., estimated to cost \$125,000 with equipment. Layton, Hicks & Forsyth, Braniff Building, Oklahoma City, are supervising architects.

Davis & Wilson, 525 South Thirteenth Street, Omaha, Neb., architects, are preparing plans for a three-story and basement automobile service, repair and garage building, to cost about \$90,000 with equipment.

The Indian Territory Illuminating Oil Co., Wewoka, Okla., has plans under way for a new one-story oil storage and distributing plant, to cost about \$35,000 with equipment.

The Baker Mfg. Co., 1315 West Eighth Street, Kansas City, Mo., manufacturer of plumbing equipment and supplies, is arranging for the establishment of a new factory branch and distributing plant at End, Okla.

Fire, March 11, destroyed a portion of the electric power plant and ice-manufacturing plant of the Arkansas-Missouri Power Co., at Steele, Mo. An official estimate of loss has not been announced. It is planned to rebuild. Head-quarters are at Blytheville, Ark.

The Southwestern Light & Power Co., Braniff Building, Oklahoma City, Okla., will begin the construction of its proposed ice-manufacturing plant at Lawton, Okla., 80 x 100 ft., to cost \$150,000 with equipment. Ralph H. Oliver, 115 South Dearborn Street, Chicago, is engineer.

The Charles Theuler Planing Mill Co., Lucky Street and Prairie Avenue, St. Louis, is considering the rebuilding of the portion of its mill recently destroyed by fire, with loss reported at close to \$100,000 with machinery.

The White Eagle Oil & Refining Co., Augusta, Kan., is disposing of a bond issue of \$5,000,000, a portion of the proceeds to be used for extensions and improvements in refineries, pipe lines, etc. The company is operating oil refineries at Augusta, Fort Worth, Tex., and Casper, Wyo.

Cleveland !

CLEVELAND, March 21.

MACHINE tool sales and inquiries showed a little gain the past week over the earlier part of the month when the volume of business was unusually light. Demand, however, is stift confined for the most part to single machines, largely for replacement. No business is coming from the railroads in this territory and orders are very scarce from the automotive industry. The Harris-Seybold-Potter Co., Cleveland, manufacturer of printing presses, has purchased four or five machines. A Canton, Ohio, manufacturer of refrigerating equipment, has bought a 16 x 60-in. Pratt & Whitney model B lathe.

Export demand shows a little more life. A local manufacturer of automatic screw machines has sold five machines this month for export, two for England, two for Sweden and one for Switzerland. An inquiry from Russia for 15 turret lathes, has also been received by a local manufacturer.

The Superior Iceless Refrigerator Co., Inc., Cleveland, has purchased the Canton, Ohio, plant formerly occupied by the Gilliam Roller Bearing Co., which was recently taken over by the Timken Roller Bearing Co. The plant of the Superior company is now located in Wapakoneta, Ohio, and was purchased about a year ago from James Couzens of Detroit. The machinery is now being moved to Canton. The company is owned by Cleveland and Canton men. Charles A. Kolp, Canton, is president; Edward L. Frantz, Cleveland, vicer president; E. E. Quirk, Akron, secretary; M. J. Murphy, Cleveland, treasurer; George Lee Miller, Canton, consulting engineer and plant manager, and W. F. Marr, Canton, general sales manager.

The Hoffman Rim Co., formerly of Toledo, Ohio, has leased factory space in the former plant of the National Acme Co. on Stanton Avenue, Cleveland, and will manufacture a collapsible rim for automobiles.

The Griffin Wheel Co., Chicago, which recently took over the plant of the Standard Car Wheel Co., Cleveland, has placed contract for repairs and it is reported that approximately \$300,000 will be expended in the near future in revamping the plant and extending facilities.

The Timken Roller Bearing Co., Canton, Ohio, has, approved an expansion program during 1927 to cost about \$1,500,000, the majority of the fund to be used for machinery and operating equipment. During the past year the company expended approximately \$700,000 for similar purpose,

The Seiberling Rubber Co., Barberton, Ohio, manufacturer of tires and tubes, has work in progress on a new plant unit to cost about \$700,000 with machinery. It is purposed to develop a production of more than 6000 tires a day. Frank A. Seiberling is president.

The City Council, Brilliant, Ohio, is considering the installation of pumping equipment in connection with proposed extensions and improvements in the municipal waterworks, including purification plant, estimated to cost \$200,000. The Champ Co., Nasby Building, Toledo, is engineer.

The Libbey-Owens Sheet Glass Co., Nicholas Building, Toledo, Ohio, has plans for a one-story addition, reported to cost in excess of \$150,000 with equipment. Lockwood, Greene & Co., Bunl Building, Detroit, are architects and engineers.

The Heller-Aller Co., Napoleon, Ohio, manufacturer of steel towers, windmills, galvanized steel tanks, tank structures, tank heaters and pneumatic water supply systems, has appointed F. C. Turner, 116 Broad Street, New York, export agent for its line of products.

The Atlas Steel Corporation, Dunkirk, N. Y., has removed its district sales office and warehouse in Cleveland to 5140-A Superior Avenue.

The offices of the Artistic Lighting Equipment Association, formerly at 424 Guarantee Title Building, Cleveland, have been removed to 711 Graybar Building, 420 Lexington Avenue, New York.

The Patterson Foundry & Machine Co., East Liverpool, Ohio, is in the market for four used engine lathes, American or Le Blond preferred. Specifications call for one 20-in. x 10-ft., one 30-in. x 24-ft., one 73-in. x 35-ft. and one 25-in. x 14 ft.; single pulley drive and taper attachment preferred.

Chicago

CHICAGO, March 21.

SALES and new inquiry for machine tools are small. A fair amount of business is before the trade but buyers appear to be in no hurry to place orders. The Santa Fe list, to which has been added a Buffalo or equivalent shear, is the main center of interest. The Northern Pacific is asking for prices on a carwheel grinding machine and the Tilden Technical High School, Chicago, will buy a 20-in., motor-driven band saw. The Stockton Junior High School, Chicago, is asking for bids on four lathes with 12-in, swing and 54-in. bed, a bench jointer with 6-in. blades, a band saw with 16-in, wheels and an emery grinder equipped with two 8-in. x %-in. wheels. A machine builder at Rockford, Ill., has purchased three milling machines and a shaper and a manufacturer of heating specialties bought a 20-in. shaper. Inquiries and orders for repair parts are unusually numerous.

The Morton Salt Co., 80 East Jackson Boulevard, Chicago, will construct a boiler house in connection with the rebuilding of that portion of its plant destroyed by fire Feb. 28. The cost will be in excess of \$150,000.

Ground has been broken for the new foundry and machine shop of the Novelty Iron Works, Sterling, Ill. The main structure will be L shaped, 50×32 ft. and 92×32 ft. The new foundry will be 50×100 ft.

The T-Z Railway Equipment Co., 1720 Lytton Building, Chicago, has been incorporated and will specialize in sales of railroad equipment. Officers are: President, G. S. Turner, formerly president Viloco Railway Equipment Co., Chicago; vice-president, secretary and treasurer, F. G. Zimmerman, formerly vice-president and secretary Viloco Railway Equipment Co.; and vice-president, F. J. Kearney, who has been mechanical expert for the Okadee Co., Chicago, and the Viloco Railway Equipment Co.

The Climax Engineering Co., Clinton, Iowa, has appointed the following distributers: Belknap Hardware & Mfg. Co., Louisville, Ky., in Kentucky, northern Tennessee, West Virginia and parts of Virginia and North Carolina, and Woodward-Wight & Co., New Orleans, in southern Louisiana and southern Mississippi.

The Whiting Corporation, 157th Street, Harvey, Ill., manufacturer of cranes, hoists, etc., has asked bids on a general contract for a one-story foundry addition, 70×160 ft., to cost about \$35,000. Perkins, Chatton & Hammond, 160 North LaSalle Street, Chicago, are architects.

The City Council, Aitkin, Minn., is considering plans for extensions and improvements in the municipal electric light and power plant, including the installation of additional equipment. It is purposed to begin work in the spring.

The Minnesota Garage, Inc., 316 First Avenue, N. E., Minneapolis, Minn., is completing plans for a four-story and basement service, repair and garage building, 120 x 125 ft., estimated to cost \$100,000. Larson & McLaren, Baker Building, are architects.

The Meadows Mfg. Co., Bloomington, Ill., manufacturer of washing machines, agricultural implements, etc, is said to be arranging to ask bids in April for its proposed plant addition, to cost about \$50,000 with equipment.

The Common Council, Thief River Falls, Minn., has plans for the construction of a municipal hydroelectric power plant to cost about \$65,000, and will soon begin work. The Jacobson Engineering Co., 430 Oak Grove Street, Minneapolis, Winn is engineer.

The Central Iowa Power & Light Co., Fort Dodge, Iowa, has been organized to take over and consolidate the company of the same name and the Central Iowa Power & Light Co., operating at Carroll and vicinity. The new company will have light and power properties totaling \$30,000,000 in value, and plans extensions and improvements.

Ovens, conveying equipment, power apparatus, etc., will be installed in the three-story and basement plant to be constructed by Regan Brothers, Fifth Street and Seventh Avenue, North, Minneapolis, Minn., to cost about \$150,000, for which foundations will soon be laid.

The Linco Oil Co., Robinson, Ill., is considering the construction of a new one and two-story storage and distributing plant at Urbana, Ill., to cost close to \$80,000 including equipment.

The City Council, St. Francisville, Ill., will soon take bids for motor-driven pumping equipment, 60,000-gal. steel tank on tower, and other equipment for the municipal waterworks. Cole, Asire & Moore, J. M. S. Building, South Bend, Ind., are engineers.

L. G. Hallberg & Co., 110 South Michigan Avenue, Chicago, architects, have asked bids on a general contract until April 1 for a proposed three-story automobile service, repair and garage building, 110 x 150 ft., to cost close to \$1,000,000 with equipment.

The Miracle Mills, Melrose, Minn., care of J. H. A. Brahtz, Builders Exchange Building, St. Paul, Minn., engineer, has plans for extensions and improvements in its hydroelectric power plant, including the installation of additional equipment. It is expected to ask bids on a general contract early in April. The work is reported to cost more than \$40,000.

The Western United Gas & Electric Co., Peoria, Ill., is said to have plans under way for the construction of a new artificial gas plant at DuQuoin, Ill., with boiler plant, screening, purifying and other departments, to cost more than \$200,000.

The Standard Oil Co., 910 South Michigan Avenue, Chicago, is completing plans for a new three-story oil storage and distributing plant at Peoria, Ill., to cost about \$175,000 with equipment.

Detroit

DETROIT, March 21.

CONTRACT has been let by the Detroit Brass & Malleable
Works, 1177 Holden Street, to O. J. Edinger, Wyandotte,
Mich., for a new plant at Wyandotte, to cost about \$35,000.
H. S. Angell, Transportation Building, is architect.
The Iron Mountain Electric Light & Power Co., Iron

The Iron Mountain Electric Light & Power Co., Iron Mountain, Mich., and its affiliated company, the Peninsular Power Co., are arranging for expansion and improvements during 1927 to cost \$340,000. Of this amount, more than \$100,000 will be expended in the Iron Mountain district. Both companies are operated by the North American Co., Cleveland.

The new plant of the Peninsular Stove Co., Fort Street. Detroit, will represent an investment of more than \$600,000, instead of a smaller sum, previously noted. It will consist of one- and two-story buildings, comprising a complete self-contained manufacturing unit, and will replace the former plant of the company recently sold.

The Dow Chemical Co., Midland, Mich., plans the construction of a new power plant in connection with proposed additions and improvements in its factory to cost in excess of \$500,000.

The Norge Corporation, Detroit, recently organized by E. E. McCray, president, McCray Refrigerator Co., Kendallville, Ind., and associates, to manufacture electric refrigeration equipment, has acquired the plant of the Detroit Gear & Machine Co., East Woodbridge Avenue, for its initial works. Mr. McCray will be chairman of the board of the Norge organization; Howard E. Blood, head of the Detroit Gear Co., president; W. C. Rand, Motor Products Corporation, vice-president, and W. C. Rand, Jr., secretary and treasurer.

The Detroit Street Railway Transportation Co., St. Jean and Shoemaker Streets, Detroit, is said to be considering the construction of new carbarns, with shop facilities, to cost about \$100,000 with equipment,

The Erb-Joyce Foundry Co., Vassar, Mich., has begun operations in the second unit of its plant, recently completed, and will devote production to engine flywheels. It is proposed to develop a schedule of 1000 flywheel castings per day.

B. W, Habel, 34 Mill Street, Pontiac, Mich., has plans under way for a new two and one-half story automobile service, repair and garage building, 100 x 115 ft., to cost about \$150,000 with equipment. E. B. Cargyle, General Motors Building, Detroit, is architect.

The Board of Education, Flint, Mich., plans the installation of manual training equipment in its proposed three-story Northern high school estimated to cost \$750,000.

for which foundations will soon be laid. Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

Oscar B. Mueller, president, Mueller Brass Co., Port Huron, Mich., has purchased the controlling interest in that company from the Mueller Co., Decatur, Ill. Mr. Mueller at the same time has announced the disposal of his interest in the Decatur company and also in Mueller, Ltd., Sarnia, Ont. Robert and Philip Mueller of Decatur will continue as stockholders and directors of the Mueller Brass Co. The Port Huron company will begin work immediately on a two-year expansion program, involving an expenditure of more than \$500,000 for plant extensions and new equip-

The McRae Steel Co. has removed its offices from 503 American State Bank Building, to 509 New Free Press Building, Detroit.

Indiana

Indianapolis, March 21.

PLANS have been filed by the Indian Refining Co., Lawrenceville, Ill., for a one-story oil storage and distributing plant, 50 x 125 ft., at Indianapolis, with one-story power house, 60 x 60 ft. The entire project will cost close to \$75,000 including equipment. Col. J. H. Graham is president.

The Bloomington Limestone Co., Bloomington, Ind., now being organized with a capital of \$200,000, plans the installation of a stone quarry and finishing plant on the Rockport Road, to cost about \$80,000 with machinery. The new company will be headed by C. L. Rawles, president; R. H. Kelley, vice-president; and S. C. Freese, secretary and treasurers all of Ricerbianes. and treasurer, all of Bloomington.

Bids will be asked before the end of the month by the Board of Education, Evansville, Ind., for the erection of its boys' vocational school, estimated to cost \$150,000 with equipment. F. J. Schlotter, 113 South Fourth Street, is

The Sherman-White Co., Clinton and Murray Streets, Fort Wayne, Ind., has plans for a new two-story cold storage and refrigerating plant, to cost about \$55,000 with equipment. It is purposed to begin work early in the summer. M. S. Mahurin, Standard Building, is architect.

The Fairbanks-Morse Co., Indianapolis, has arranged for the removal of a third department from the local plant to its works at Beloit, Wis., and will use available space at the Indianapolis works for increases and changes in the processing and other divisions. The removal of three divisions, and probably other departments in the near future, is due to refusal of the County officials to grant a clear title to property at Twenty-first Street and Northwestern Avenue, secured by the company some time ago for enlargements.

The Economy Governor Co., Anderson, Ind., F. M. Pickering, head, manufacturer of mechanical equipment, is re-ported to be contemplating the construction of a new one-story plant.

The Board of School Trustees, Montgomery and Clinton Streets, Fort Wayne, Ind., is asking bids until March 29 for manual training equipment for the North Side high school; also for laboratory equipment, and steel lockers. H. J. Collier, Jr., is business manager.

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Milwaukee

MILWAUKEE, March 21.

WHILE inquiry is of moderate proportions, the volume of new business being booked by machine-tool builders is somewhat disappointing. There is much hesitancy among prospective buyers relative to future requirements, and current orders usually are to meet necessary replacements rather than extensions of capacity. A better feeling is apparent in the foundry and machine shop industries, however, and their volume of new business is increasing more satisfactorily.

The Northern Conveyor & Mfg. Co., Janesville, Wis., has engaged W. H. Blair, local engineer, to design a one-story brick and steel addition, 100×160 ft., work on which will start about May 1. The cost, with equipment, is estimated at \$75,000. The company recently increased its capital stock from \$100,000 to \$200,000 to accommodate expansion. G. R. Whitnall is secretary.

The Board of Water Commissioners, Racine, Wis., is ask ing bids until April 4 for the final unit of a new \$250,000 filtration plant for the city waterworks. Requirements include a 36-in. cast iron intake line, a low lift pump house and one 10,000,000-gal. turbo centrifugal pump and generator, or a motor-driven centrifugal pump of similar capacity. The engineers are Alvord, Burdick & Howson, 1417 Hartford Building, Chicago. J. E. Beaugrand is city engineer.

The David White Co., Milwaukee, manufacturer of tran sits, levels, optical instruments, etc., has moved its plant and offices from 915 Chestnut Street to larger quarters at 315 Court Street, and is buying some miscellaneous equipment. David White is president and manager.

The Marathon Battery Co., Wausau, Wis., is having plans prepared by Oppenhamer & Obel, architects, Wausau and Green Bay, Wis., for its proposed new \$75,000 storage battery and dry cell factory, 100 x 160 ft., to be erected on a site donated by the city of Wausau. Contracts will be let about April 10. W. H. Thom is president.

Municipal Foundries, Inc., West Allis, recently incorporated with \$50,000 capital stock, will operate in the shops of the Hanson-Zimmermann Foundry Co., 648-652 Seventyseventh Avenue, which has started work on a brick and steel addition, 70 x 120 ft., costing about \$35,000. The new company will specialize in castings for municipal projects. Palmer E. Hanson and LeRoy G. Zimmermann are the prin-

The Hunter Machinery Co., Milwaukee, has been appointed distributer in Wisconsin for the Climax Engineering Co., Clinton, Iowa, and will also handle Climax sales in western Michigan through its Grand Rapids offices.

Gulf States

BIRMINGHAM. March 21.

P'ANS are being arranged by the Birmingham National Garage, Inc., 2028 First Avenue, North, Birmingham, for a seven-story service, repair and garage building on First Avenue, 110 x 180 ft., to cost \$600,000 with equipment. Edward S. Moore is president.

The Mississippi Power Co., Gulfport, Miss., operated by the Southeastern Power & Light Co., Birmingham, is disposing of a bond issue of \$2,000,000, a portion of the proceeds to be used for extensions and improvements.

Ovens, power equipment, conveying and other machinery will be installed in the proposed new plant to be erected by the Nafzinger Bakery Co., Magnolia Street, Wichita Falls, Tex., to cost \$120,000 with equipment.

The G. R. Mueller Co., Brown-Marx Building, Birming ham, machinery dealer and manufacturers' agent, has in-quiries out for a %-yd. capacity steam shovel; crawler type.

The Municipal Garage Department, West Palm Beach, Fla., has plans under way for a new service, repair and garage building, 180 x 500 ft., to cost about \$75,000. The machine shop unit will be about 60 x 100 ft., equipped with tools to cost approximately \$15,000. Frank H. Mathews is city manager.

The Craig Shipbuilding Co., Long Beach, Cal., George L. Craig, president, is reported to be arranging for the construction of a new branch shipyard in the Bay Mabel district, Fort Lauderdale, Fla.

The water department, W. J. Richardson, superintendent, Orange, Tex., is said to be planning the installation of deep-well electrically-operated pumping equipment for the municipal waterworks.

The Southern Ice & Utilities Co., Dallas, Tex., is completing plans for a new ice-manufacturing and cold storage plant at Texarkana, Tex., to cost about \$250,000 with equip-

The Products Tank Line, Baton Rouge, La., a subsidiary of the Union Tank Car Co., 21 East Fortieth Street, New York, is reported to have plans for a new car repair shop at Bossier, near Shreveport, La., to cost close to \$60,000 with equipment.

The Texas-Louisiana Power Co., Fort Worth, Tex., is disposing of a bond issue of \$1,000,000, a portion of the fund to be used for extensions and betterments in plant and system. A. P. Barrett is president.

The City Council, Water Valley, Miss., is considering extensions and improvements in the municipal electric light and power plant, including the installation of a new Diesel engine-generator unit and auxiliary equipment. The work will cost close to \$50,000.

The Southland Cotton Oil Co., Bossier, near Shreveport, a., is considering the rebuilding of the portion of its plant destroyed by fire March 11, with loss reported at \$100,000 including equipment.

The Florida Portland Cement Co., Tampa, Fla., will begin superstructures for a group of buildings to comprise its local mill, which will include a power house and machine shop. It will be equipped for an initial output of about 125,000-bbl. per month and will cost more than \$1,500,000. The Cowham Engineering Co., 111 West Monroe Street, Chicago, is in charge.

The East Texas Public Service Co., Marshall, Tex., planning the construction of a one-story cold storage and refrigerating plant at Mount Vernon, Tex., to cost \$40,000 with equipment. John Carpenter, East Austin Street, Marshall, is architect.

Southern Ice & Storage Co., Englewood Street, Houston, Tex., has plans for the construction of a new ice-manufacturing plant, to cost about \$150,000 with ma-R. H. Morris is manager, in charge.

Cincinnati

CINCINNATI, March 21.

MACHINE tool orders the past week have been in moderate volume, but sales during the first 20 days of March were considerably below those in the corresponding period in March, 1926. With the exception of two or three important companies which have booked a satisfactory volume of business, local builders are disappointed at the failure of most prospective buyers to close for equipment for which inquiries were sent out some time ago. While automobile makers are beginning to purchase tools at a better rate, they have been limiting expenditures so as to provide machinery only for replacement purposes. Pending railroad business is heavy.

A Cincinnati manufacturer has received an order for six lathes for shipment to Germany. transaction, added to the purchase made two weeks ago, makes a total of 13 lathes which this company will deliver to German users.

The Union Gas & Electric Co., Cincinnati, is reported to be planning the construction of a steam-operated power plant for central heating service, to cost more than \$1,000,000 with equipment.

The Paint Pigment Co., Cincinnati, recently in receivership, has been taken over by Max Grant, formerly president and treasurer, and will continue operations as heretofore. Plans are under way for expansion, including the installa-tion of additional machinery.

The Schmutz Mfg. Co., 1204 West Main Street, Louisville, manufacturer of printing equipment, dies, etc., has awarded a general contract to the Austin Co., Cleveland, for a one-story plant, 90 x 200 ft., estimated to cost close to \$50,000.

The L. J. Breed Equipment Co., James Building, Chattanooga, Tenn., machinery dealer, has inquiries out for a steam shovel, crawler type, with 34-yd. capacity bucket.

The Eastern Kentucky Natural Gas Co., 255 Delmar Avenue, Lexington, Ky., D. L. Johnson in charge, is con-sidering plans for the construction of a pipe line in Owsley County to Lexington and vicinity, reported to cost in excess of \$90,000 with booster stations, etc.

Officials of the Frigidaire Corporation, Dayton, Ohio manufacturer of electrical refrigerating equipment, a divi-sion of the General Motors Corporation, Detroit, have formed ubsidiary under Canadian laws, to be known Frigidaire, Ltd., to operate in England, France and Italy L. C. Shannon will be vice-president and assistant managing director of the new organization; T. S. Merrill, secretary of the parent company, will act in a similar capacity for the new organization.

Alexander M. Robinson, Georgetown, Ky., dealer, has inquiries out for a steam dryer of shell and agitator type, about 5 ft. in diameter and 16 ft. long, Chicago Mfg. Co. type preferred; also for a number of rendering tanks, 5 x 12 ft.

The Board of Education, Ashland, Ky., is considering the installation of manual training equipment in a proposed junior high school to cost about \$200,000, for which plans will be prepared by Warner & McCornack, Cleveland, arjunior high school will be prepared by

Daniel Carruthers, Bank of Commerce Building, Memphis, Tenn., is desirous of getting in contact with a plant in position to contract for the production of a line of aluminum specialties for domestic use in quantity lots.

South Atlantic States

BALTIMORE, March 21.

CONTRACT has been let by the Southern Couch Mfg. Co., 431-37 Colvin Street, Baltimore, to A. Goodman, 32 North Paterson Park, for a four-story and basement plant, 32 x to cost \$100,000 with equipment. Stanislaus Russell, 11 Lexington Street, is architect.

L. Boyd & Co., 706 Light Street, Baltimore, machinist, is planning the construction of a new one-story machine shop to cost about \$14,500 with equipment.

Fire, March 16,- destroyed a portion of the chair factory of the American Furniture Co., Danville, Va., with loss reported at \$40,000 including equipment. It is planned to rebuild.

Lewter F. Hobbs, Inc., Norfolk, Va., machinery dealer.

has inquiries out for a steam or gasoline shovel, crawler type, about 34-yd. capacity.

Swartz & Everett, National Bank of Commerce Building, Norfolk, Va., machinery dealers, have been inquiring for to 10-ton electric or hand-operated shop crane, about 40ft. span; also for a 10-ton shop crane, 30-ft. span.

The Potomac Electric Power Co., Fourteenth and C Streets, Washington, will issue bonds for \$1,608,000, and preferred stock in amount of \$5,760,699, a portion of the proceeds to be used for extensions and improvements.

The Board of Trustees, Agricultural and Mechanical School, Sparta, Ga., is said to be planning the installation of electrically-operated pumping equipment for a proposed water supply system.

Virginia Machinery & Well Co., The 1319 East Street, Richmond, Va., has inquiries out for a motor-driven air compressor, 300 to 500-cu. ft. capacity, air pressure, 100 to 125 lb.; also, for deep-well centrifugal pumping equipment, motor-driven.

The South Hill Mfg. Co., Douglas' Avenue and Portland Street, Port Norfolk, Va., manufacturer of box shooks, crates, etc., is considering rebuilding the portion of its plant destroyed by fire March 13, with loss reported in excess of \$150,000 with equipment.

The Hackley-Morrison Co., Inc., 204 North Jefferson Street, Richmond, Va., machinery dealer, has inquiries out for a 36-in, steam shovel, Marion type,

The Prince George Electric Light & Power Co., Hope-ell, Va., is said to be planning the construction of a steam-operated electric power plant on local site.

The Construction Equipment Co., Columbia, S. been made a distributer for the Novo Engine Co., Lansing,

Five manual training shops will be installed in the new city college at Baltimore, work on which has been started in the northeastern section of the city. The departments electrical, sheet metal include mechanical, wood-working and printing. The entire institution will accommodate 2500 students and is estimated to cost \$2,500,000. Buckler & Fenhagen, 325 North Charles Street, are architects.

Pacific Coast

SAN FRANCISCO, March 16.

PLANS have been filed by the Perfect Caster Mfg. Co., Long Beach, Cal., for a one-story addition, reported to cost about \$14,000 with equipment.

The Union Ice Co., 354 Pine Street, San Francisco, has authorized plans for a new one-story ice-manufacturing plant, 45 x 68 ft., at Santa Cruz, Cal., to cost approximately \$65,000.

Ovens, power equipment, conveying and other machinery will be installed in the proposed one- and two-story plant, to be constructed by the Continental Bakerles Corporation, Pasadena, Cal., estimated to cost \$165,000. J. & D. B. Parkinson, Title Insurance Building, Los Angeles, are ar-

one-story power plant will be constructed by the Baldridge Packing Co., Los Angeles, in connection with a new packing plant at 3501 East Vernon Avenue. The entire project is reported to cost about \$60,000. Nelson & Wylie, Bank of Italy Building, Los Angeles, are engineers.

The Hedlund Lumber & Mfg. Co., 806 North Stone Street, Spokane, Wash., is reported to be planning the construction of a new mill in the vicinity of Republic, Wash., to cost in excess of \$300,000 with machinery. Work will begin in the spring.

The Washington Iron Works, Sixth Avenue, South, Seattle, has plans under way for a one-story forge shop, 48 x 190 ft., to cost approximately \$18,000. John Graham. Dexter Horton Building, is architect.

The California Produce Terminal, Inc., Los Angeles. ently organized with capital of \$2,200,000 by the Frank Meline Co., Los Angeles, and associates, plans the installation of a cold storage and refrigerating plant in a proposed group of market buildings, to cost in excess of \$500,000.

The Board of Trustees, Imperial Irrigation District, Brawley, Cal., has authorized plans for the construction of three hydroelectric power plants at the Rositas Dam, Alamo Dam, and at No. 8 heading, in connection with an irrigation system. The entire project will cost \$1,500,000. M. J. Dowd is chief engineer.

The Pacific Gear & Tool Co., 1035 Folsom Street, San Francisco, has filed plans for a one-story machine shop,

The E. K. Wood Lumber Co., Anacortes, Wash., is considering the construction of a new lumber plant and planing mill at Burrows Bay, to cost in excess of \$135,000 with equipment.

The American River Water & Power Co., Auburn, Cal., has secured permission to utilize waters from the Middle

Fork of the American River, Placer County, for a hydroelectric power development, with capacity of 31,800 hp., estimated to cost \$5,000,000. The company has also secured authority to utilize waters from the same stream in another portion of the county for a similar plant with capacity of 27,500 hp., the entire project to cost close to \$2,000,000 with transmission system.

The Arcadia Lubricator Co., 1355 West Ocean Avenue, Long Beach, Cal., manufacturer of automatic lubricating systems, is entering on an expansion program that calls for the establishment of additional branches in Eastern industrial centers. New branches will be opened soon in Cleveland, Pittsburgh, Philadelphia and Boston. The company now has branches in St. Louis, Chicago, Detroit and New York. Officers are: Dr. W. Harriman Jones, president; F. A. Knight, vice-president; W. B. Lynch, general manager and treasurer; Max L. Pray, salesmanager.

Canada

TORONTO, March 21.

MACHINE tool sales the past week or ten days show a general improvement over those of previous weeks this year. Inquiries are also increasing and lists calling for from two to six tools are appearing more frequently. The bulk of current demand, however, is for replacement purposes and comes from diversified lines of industry. The movement of small tools also has increased, with buyers showing interest in future requirements.

White & Thomas, 212 Simcoe Street, Toronto, Ont., are in the market for a trip hammer for sheet metal work.

J. C. Henry & Sons, Markdale, Ont., are in the market for a 10-hp, motor, 3-phase, 60 cycle, 220 volt, 1200 r.p.m. or less.

Bids will be called soon for the construction of a substation for the Toronto Hydro-Electric System and the equipment will include eight banks of 1000 kva. single phase transformers.

The Canadian Westinghouse Co., Ltd., Hamilton, Ont., is having plans prepared by B. H. Prack, 43 James Street North, for an addition to cost \$60,000.

Bids are now being received by F. E. Coombe, F. E. Coombe Furniture Co., Kincardine, Ont., for an addition to a factory to cost \$30,000. Plans and specifications with owner.

Ewart, Armer & Byam, Ltd., Excelsior Life Building, Toronto, is preparing plans for the erection of a factory for Link-Belt, Ltd., 265 Wellington Street West. Tenders for construction of the first unit will be called about the end of this month.

Bids are being received by L. L. Jacobs, manager of Fess Oil Burners of Canada, Ltd., 65 Trinity Street, Toronto, for the erection of a \$50,000 factory. No closing date is set.

A number of contracts have been awarded and construction work will start immediately on a \$40,000 addition to the plant of the Guelph Stove Co., Guelph, Ont.

The Imperial Radiator Co., Ltd., 250 St. Helens Street, Toronto, has started work on an addition and alterations to its foundry. The Jackson-Lewis Co., Ltd., 1114 Federal Building, has the general contract.

Leyland Motors, 100 St. Patrick Street, Toronto, Ont., are in the market for a 16-in. gap lathe.

Foreign

THE Government Water Power Board, Stockholm, Sweden, is completing plans for the construction of a hydroelectric generating plant on Lake Vanern. Other work to be carried out during 1927 includes the building of new hydroelectric power plants at Alfkarleby and at Venjan Lake, with a new steam-operated generating station at Vesteras, for auxiliary service in connection with a hydroelectric plant in that vicinity. The board will make extensions in the present hydroelectric power plant at Motala and will construct new transmission lines and substations. The American Consulate, Stockholm, K. deG. MacVitty, consul, has information regarding the projects.

E. I. du Pont de Nemours & Co., Wilmington, Del., are said to be planning the construction of a new plant in France for the production of Duco automobile finishing materials. The project, it is said, will be carried out in cooperation with French interests.

The New Zealand Government Railways, Auckland, N. Z., are asking bids until June 13 for a quantity of tools for construction and repair shops, including six lathes, radial drills, shapers, milling machines, flanging machines, drop hammers, mechanical blowers, etc.; also for four overhead electric traveling cranes,

The municipal water board of a city in Brazil is interested in the purchase of American equipment for a waterworks system, in connection with proposed extensions and betterments in water supply, and is desirous of receiving catalogs of valves, meters, hydrants, pipe from 3½ to 18 in. diameter, and other equipment. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Brazil No. 237413. The American Consulate at Bahia, Brazil, Allan Dawson, vice-consul, also has information regarding the project.

The Government of the State of Pernambuco. Brazil. Dr. Estacio Coimbra, Recife, Pernambuco, Governor, is disposing of a bond issue of \$6,000,000 in the United States, the proceeds to be used primarily for the construction of wharves, docks and warehouses at the Port of Pernambuco, including traveling cranes, conveying machinery, loading and other material-handling equipment.

The Navy Department, Washington, has secured an appropriation of \$1,150,000 for the establishment of an aviation center at Ford Island, Hawaii, including construction and repair shops for airplanes, hangars, storehouses, power house, magazines, etc.

Industrial Finances

The Pittsburgh Coal Co., Pittsburgh, reports an operating loss of \$2,037,059 in 1926, and an even larger reduction in its surplus after disbursements to minority interests in subsidiary companies and allowance for taxes and the scrapping of obsolete mine plants. The surplus as of Dec. 31, 1926, was \$71,080,776, a decline of \$2,279,748 from last year.

The Niles-Bement-Pond Co., New York, reports net profits for the year ended Dec. 31, 1926, of \$192,177, equal after dividend requirements on preferred stock of subsidiaries to \$5.76 a share on the company's 15,168 shares of preferred stock, and compared with a net loss of \$799,519 in 1925.

Central Alloy Steel Corporation, Massillon, Ohio, reports net profits for 1926, after depreciation, Federal taxes, etc., of \$3,331,393, equivalent after preferred dividend requirements to \$2.02 on the 1,320,625 shares of common stock outstanding. The company which was formed during the year by a merger of the United Alloy Steel Corporation, Canton, Ohio, and the Central Steel Co., Massillon, had net sales for the year of \$74,516,788, and an operating profit of \$6,274,090.

United States Cast Iron Pipe & Foundry Co., Burlington, N. J., reports net profits from 1926 operations of \$5,049,367, compared with \$5,501,265 in the preceding year. During the year the company appropriated \$5,000,000 for improvement, additions and new construction, and showed a surplus account as of Dec. 31, 1926, of \$13,171,045.

The Ludium Steel Co., Watervliet, N. Y., reports net income for 1926 of \$285,679, compared with \$400,554 in 1925, and a net working capital as of Dec. 31, 1926, of \$2,056,878 compared with \$2,246,863 one year ago.

The Columbia Steel Corporation, San Francisco, increased its net income during the past year \$312,328, or to \$1,090,271, after deducting interest and Federal taxes. After a charge for preferred dividends, which are still being paid in common stock to release funds for development, the net is equal to about 36c, a share on the 1,180,209 shares of common stock outstanding. The total net was equal to \$109 a share on the preferred stock. Sales exceeded \$11,977,000.

The Crane Co.; Chicago, reports 1926 net earnings of \$9,250,957, after all charges and taxes, compared with \$8,342,029 in 1925. Consolidated balance sheet, as of Dec. 31, 1926, shows current assets of \$54,059,931 as compared with \$53,509,976 in 1925.

Rogers-Brown Iron Co., Buffalo, reports net loss of \$483,174 for the year ended Dec. 31, 1926, compared with a loss of \$1,168,517 in the previous year.

Colorado Fuel & Iron Co., Denver, Colo., reports consolidated net income in 1926 after depreciation, interest and Federal taxes of \$2,748,414, equivalent after preferred dividends to \$7.60 a share on the 340,505 shares of common stock. This compares with \$1,752,427 or \$4.65 a share in 1925. The company did a gross business of \$35,758,040 in 1926, compared with \$34,537,134 in the previous year, and surplus, as of Dec. 31, 1926, amounted to \$1,839,368, comparing with \$2,292,989 one year ago.

The Vanadium Corporation of America and subsidiaries, New York, showed a net income of \$1,980,031 for the year ended Dec. 31, equivalent after depreciation, depletion and other charges to \$5.26 on the 376,637 shares of no par capital stock outstanding, and comparing with \$1,527,730 or \$4.43 a share in 1925.

Report of the Penn Seaboard Steel Corporation, Philadelphia, for the year ended Dec. 31, 1926, shows a net profit of \$24,556, after all expenses, compared with a deficit of \$82,412 in 1925 and a deficit of \$329,803 in 1924.

St. Louis Coke & Iron Corporation, 208 South LaSalle Street, Chicago, reports net profit for 1926 of \$434,926. During the year total sales amounted to \$7,472,422, compared with \$6,954,434 in 1925, and inventories, as of Dec. 31, 1926,

amounted to \$2,638,530, compared with \$1,286,629 one year ago.

S. Duncan Black, president, has announced that the total billings of the Black & Decker Mfg. Co., Towson, Md., for the months of January and February of this year show a 20 per cent increase over the same period in 1926.

Worthington Pump & Machinery Corporation, New York, reports net income for 1926 of \$365,663, equivalent after depreciation and Federal taxes to \$2.29 a share on the 159,145 shares of Class A and Class B preferred stock, and compared with \$529,124 or \$3.32 a share on preferred stock

Western Pipe & Steel Co. of California, 444 Market Street, San Francisco, reports net earnings for the year ended Dec. 31, 1926 of \$529,236, after all charges, including interest and reserve for taxes, but before charging off depreciation. After \$165,000 for depreciation, the net sum of \$363,316 was carried to surplus from the year's operations.

The Eastern Rolling Mill Co., Baltimore, reports net in-come for 1926 after all charges of \$492,078, compared with \$921,935 in 1925. After dividends and reserve for contingencies the surplus for year was \$75,519 as against \$382,498 in the previous year.

Fairbanks-Morse & Co., reports net income for 1926 after all charges of \$2,740,387, or \$6.03 a share on the common stock, compared with \$3,016,278, or \$6.74 a share in

New Trade Publications

Sand Blast Machinery.—W. W. Sly Mfg. Co., Cleveland. Bulletin S-136 describing with illustrations the Slyblast tilted mills for cleaning castings, taps, drills, forgings and various kinds of foundry products. The three sizes manufactured and the necessary accessories are described.

Cutting Tools.—Unishear Co., Inc., Flatiron Building, New York. Booklet dealing with the Unishear for cut-ting both inside and outside of straight lines and curves in cold rolled steel of various specifications. A directory of the various types of companies using the tool is included.

Rust Preventing Paints .- Detroit Graphite Co., Detroit. Bulletin describing various types of paints designed to prevent rusts on steel frameworks of all sorts of commercial and industrial structures. Of particular interest is the section on the application of paint and the table of recommendations for the type of paint for different kinds of jobs under normal conditions.

Steam Cleaning Tanks.—Reed Air Filter Co., Louis-le, Ky. Leaflet dealing with steam cleaning tanks ville, Ky. for all kinds of air filters.

Automatic Pulverizers.—Raymond Brothers Impact Pulverizer Co., Chicago. Catalog dealing with pulveriz-ing machinery with detailed presentation of various pulverizing problems and illustrations of the type of pul-verizer best adapted to different sorts of materials. Description of a vacuum air separating plant is included.

Welding and Cutting Apparatus.—Alexander Milburn Co., 1416 West Baltimore Street, Baltimore. New edi-tion of the company's catalog, vest pocket size, in which the following products are listed: torches, tips, outfits, regulators, manifolds, adaptors, accessories, welding rods and fluxes, acetylene generators, portable trucks, paint guns and sprays, oil preheaters and carbide lights.

Power Units.-Climax Engineering Co., Clinton, Iowa. Bulletin K, dealing with the company's Trustworthy engines with reference to their adaptation to use on sand pumps and crushers, and Bulletin O, dealing with the same units as a source of power for saw mills.

Arc Welding Sets.—General Electric Co., Schenectady, N. Y. GEA-569, adequately describing the company's constant-potential arc welding sets, offered in sizes from 400 to 1000 amperes.

Wheelbarrows .- Sterling Wheelbarrow Co., Milwaukee. Handsomely printed and illustrated catalog con-taining details of construction and adequate descriptions of various types of wheelbarrows. Hand trucks designed for use in mines and blast furnaces are included.

Recuperators.-Carborundum Co., Perth Amboy, N. J. Bulletin E-11 describes the . "Carbofrax recuperator" as applied to industrial furnaces.

Laboratory Fittings.—United States Stoneware Co., ron, Ohio. Leaflet gives description and price list of Akron, Ohio. various products.

Electric Furnaces.—Automatic & Electric Furnaces, Ltd., 173 to 175 Farringdon Road, London, England. Pamphlet of 16 pages, illustrated, describes various small Wild-Barfield electric furnaces for laboratories and

THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)

THE nails were shipped by boat and something happened and now they lie beneath the waters of the Mississippi. The branch plant was immediately perturbed, to put it lightly. "We have only ten days' supply," they reported in haste to general purchasing "Why was it necessary to send by headquarters.

Thus, commented the purchasing chief, you can see how the virus of close range buying has seized industrial managers. "We naturally supposed they had 60, and at any rate, 30 days' stock. Styles in nails do not change. And yet chances are taken that have no justification in any saving of inventory."

We could scarcely refrain from remarking that we cannot afford to take like chances in handling our materials for publication. Also we do not have to deliver goods under varying degrees of urgency but sharply every week we must meet train schedules. Otherwise we find ourselves deluged with calls as to where is or why isn't THE IRON AGE.

"The wit to compose this was not mine," writes D. W. "I clipped it."

If Monsieur Kerkoff, Parfumeur, Should Write an Advertisement on Lubricating Oils Is it that monsieur would care for a soupçon of Lubricating Oils? It is oh, so necessary that one lubricate the wheels of one's Steel Mills! But wait: Kerkoff has assembled the oils, the greases, the slushes d'Afrique. Assembled them in boxes, barrels, and kegs, of a so simple and yet elegant a design, that Monsieur le Superintendent, and his foreman de la Factorie, will say, "An Oil superb!"

There is an oil for gadgets, delicately per-fumed, made of the strong yet graceful fish— and an oil for cylinders alone, of a color most Veritably a wealth of oils to choose

And, monsieur, et le Overseer de la Factorie, le Manager du Works, a little secret—Kerkoff's Secret—ah, but that would be telling, would it not, how we compound our so delightful lubricating oils?

Sprinkle them, monsieur, upon your trains, your factories, your engines, and learn the secret of their fascination. The lubricating oils of Kerkoff are not to be resisted, mais nonf Ah, mais oui!

SEVERAL of the executives of the Iron Age Publishing Co. have there a better ing Co. have thermos bottles close at hand for the frequent drinking of water so broadly advocated today. Now comes the news of the practice at headquarters in Chicago of the National Safety Council, and with it the suggestion that we might well hereafter in our own offices also let the water go to the drinker.

In the case of the council, a boy has the job of handing to each employee a paper cup of fresh water each hour as a health measure.

The practice at first blush seems worthy of consideration in almost any factory manufacturing department, but then again one has to think of the human equation and of the resistance offered to the semblance of paternalism.

The character of the work of the safety association made it easy, it may be assumed, to assure the water boy that he would be given a welcome reception on his rounds. In fact, Managing Director W. H. Cameron has gone further and has offered a bonus to employees for daily exercise.

That article by H. P. Parrock on gray iron foundry costs seems to have hit the spot. The demand for it was so heavy that every copy of the issues of Dec. 16 and Dec. 30, in which it appeared, has been sold.

However, reprints have been made, and if you would like one, drop a line to 239 West Thirty-ninth Street, New York. No charge, of course.

A. H. D.